Service Manual

LCD Monitor Acer V173

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Acer V173 Service Manual

Important Safety Notice

1. Safety precautions

This monitor is manufactured and tested on a ground principle that a user's safety comes first. However, improper used or installation may cause damage to the monitor as well as to the user.

Warning:

- This monitor should be operated only at the correct power sources indicated on the label on the rear of the monitor. If you're unsure of the power supply in you residence, consult your local dealer or Power Company.
- Do not try to repair the monitor by yourself, as it contains no user-serviceable parts. This monitor should only be repaired by a qualified technician.
- Do not remove the monitor cabinet. There are high-voltage parts inside that may cause electric shock to human bodies.
- Stop using the monitor if the cabinet is damaged. Have it checked by a service technician.
- Put your monitor only in a lean, cool, dry environment. If it gets wet, unplug the power cable immediately and consult your closed dealer.
- Always unplug the monitor before cleaning it. Clean the cabinet with a clean, dry cloth. Apply non-ammonia based cleaner onto the cloth, not directly onto the class screen.
- Do not place heavy objects on the monitor or power cord.

2. Product safety notice

Many electrical and mechanical parts in this chassis have special safety visual inspections and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Before replacing any of these components read the parts list in this manual carefully. The use of substitute replacement parts, which do not have the same safety characteristics as specified in the parts list, may create shock, fire, or other hazards.

3. Service notes

- When replacing parts or circuit boards, clamp the lead wires around terminals before soldering.
- Keep wires away from high voltage, high temperature components and sharp edges.
- Keep wires in their original position so as to reduce interference.
- Adjustment of this product please refers to the user' manual.

01 Product Specification

1. General:

ACER BV173 is designed with LVDS interface and dual (VGA&DVI) input, it featured with embedded universal AC power supplies. It's a green product and meets all ROHS standard. The power button and display control buttons are on the front of the monitor. The monitors shall automatically display lower resolution video modes into 1280x1024 full screen display .The image can be adjusted through OSD control.

1.1 Features

Features	Specifications
Maximum resolution	1280 x 1024 @ 75Hz
Back light system	4 CCFL
Actual Resolution display	SXGA Resolution (1280x1024)
Pixel pitch	0.264(H) x 0.264(V)
Display area	337.920(H)x270.336(V) (17.0-inch diagonal)
Contrast ratio	based on the following panel source in the table below
Response time (Tr +Tf) 10%-90% @ Ta=25°C	5 ms (Typ); 10 ms (max)
Viewing angle (H/V)	based on the following panel source in the table below
Input interface	Dual (VGA&DVI)
Audio amplifier	Without Audio
Power management	Compatible with Energy Star
Plug & Play	VESA DDC 2B
University AC power supply	100V – 240V AC, 50Hz – 60Hz
OSD language	English(US), French, Italian, Spanish, Dutch, Japanese (Factory Presetting Mode is Japanese)

Attached table of Panel source:

Panel Source	Brightness(cd/m²)		Contrast Ratio		View Angle		Remark
	Min.	Typ.	Min.	Typ.	Hor.	Ver.	
MT170EN01_VC	250	300	700	1000	80°/80°	80°/80°	INL

1.2 Checking contents

Items	VGA cable	DVI cable	User's manual	Warranty card	Quick-start Guide	Installation Guide
Description	1.8	1.8	Multi	English		
	•	•	•	•		

2. Operation Specifications

The unit should suffer no visible cosmetic damage and should operate with no degradation in display quality during exposure to the operating conditions and after exposure to the non-operating conditions, in any sequence.

2.1 Environmental conditions

Operating	Specification
Temperature range	5°C to 35°C
Relative humidity	20% to 80%
Altitude	0 to 3048M (10000 ft)

Storage	
Temperature range	-20°C to 60°C
Relative humidity	5% to 80%
Altitude	0 to 9144M (30000 ft)

2.2 Safety, EMC, Ergonomics and Compatibility Requirements

Items	Description						
Safety	UL/	C	TUV/	CCC			Other
	•	•	•	•			•
EMC	FC	CE	CCC	VCC			
	•	•	•	•			
Ergonomics	TC	TC	MPR				
	•	•	•				
Compatibility	Windows		Windows 2000		Windows XP		
	•		•		•		
Power Management	Energy Star						
	•						

Note: TCO99 is for black model; TCO03 is for white model

2.3 Electrostatic Discharge Requirements

Item	Condition	Spec	
Electrostatic Discharge	IEC61000-4-2(EN55024)	Contact discharge : 4KV	
		Contact discharge : 8KV	•
		Air discharge : 8KV	
		Air discharge : 15KV	•

2.4 Reliability

Items	Condition	Spec	Note
MTBF		≧ 50,000 Hours	Excluding the LCD, CCFL
CCFL Life time	Luminance becomes 50%	≧ 40,000 Hours(min)	Note1

Note1. Display an all WHITE field at mid Brightness and Contrast settings.

3. Electrical Characteristics and Performance

3.1 Main Power Supply

The power supply unit built in the cabinet of a liquid crystal display monitor.

Items	Condition	Spec	Note
AC Input Voltage Range	Universal input full range	100~240VAC /50~60Hz	
AC Input Current	100Vac 240Vac	1.2A(max) 0.6A(max)	
AC Frequency Range	100Vac 240Vac	47Hz – 63Hz	
Inrush Current	100Vac,cold star,25°C 240Vac,cold star,25°C	40A (max) 60A(max)	Notes: 1. 2.
Regulator Efficiency	DC output full loading	≥80%	
Ripple and Noise	+14V output	<300mV	

	+5V output	<150mv	
DC Output Voltage and Current	13.5V-15.6V	1.4A(typ.),1.8A(max)	
	4.9V-5.3V	1.1A(typ.),1.4A(max)	
Power consumption	without Audio	≤35W	
Protection			See Table-1
Power management			See Table-2

Notes: 1. Before each test, the buck capacitor need to be discharged.

2. Before each test, it must be 10 minutes at least after the latest test.

Table-1

Protection	Condition	Spec
SCP(short circuit protection)		with auto-recovery function
OPP(Over power protection)	nominal AC input	≧42W

Table-2

Status	H-sync	V-sync	Video	Power	LED
Power On	on	on	active	< 35W	Blue
Power Saving	off	on	blanked	< 2W	Amber
	on	off	blanked	< 2W	Amber
	off	off	blanked	< 2W	Amber
Power Off	--	--	--	< 1W	Off

3.2 Backlight Power Supply

Items	Specification
Panel	INL MT170EN01_VC,
Lamp	4 CCFL
Input Voltage	13.5V-15.6V
Input current	1.4A(typ.),1.8A(max)
On/Off switch level	5.5V≧Von≧ 2.0 V -0.3v ≤ Voff ≤ 0.8 V
Brightness PWM duty	35%~100% *PWM:High=3.3V(3.00~3.60V),Low=0.0V,Frequency=4.0*V-Freq(Hz)
CCFL operating Voltage	See Attached Table-2
CCFL Current	See Attached Table-2
CCFL startup voltage	See Attached Table-1
Operating frequency	40~60KHz
Protect delay time	>1 second
Efficiency	75% (with dummy load)

Table-1

No Load Voltage:

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
No Load Voltage	Vs	1700	---	---	Vrms	INL MT170EN01_VC

Table-2

On Load Function:

Item	Symbol	Min.	Typ.	Max.	Unit	Remark

Frequency	F	40.0	50	60	kHz	@Brightness=3.3V
Output Current for One Lamp	I_L	3.0	7.0	8.0	mArms	INL MT170EN01_VC
Operating Voltage	Vo	---	610	---	Vrms	INL MT170EN01_VC
Kick Off Voltage Hold Up Time	T	1.0	1.5	---	S	@Vin=13.5V Brightness=3.3V

3.3 Brightness output

The test to verify specifications in this section shall be performed under the following standard conditions unless otherwise noted. The test standard conditions are:

Temperature : 25 ± 5°C
AC line input voltage : 110Vac / 60Hz or 220Vac / 50Hz.
Warm-up time : 30 minutes minimum
Video Resolution : 1280x1024@60Hz
Video input signal : 700mV ± 2%

LCD Module	BL
MT170EN01_VC (InnoLux)	>=250cd/m*m

Set brightness control and also contrast control at maximum, to measure the screen center, the light output shall ≥ BL cd/m^2 (as panel spec)

3.4 White balance adjustment

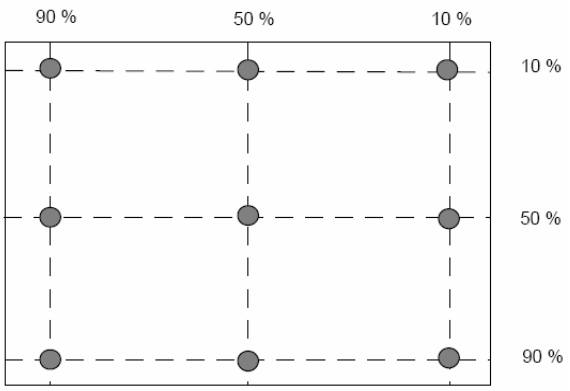
The test standard conditions refer to Sec 4.3.

Mode		Chromaticity Coordinate	
		x	y
Cool	9300K	0.283 ± 0.030	0.298 ± 0.030
User	Default	Default	Default
Warm	6500K	0.313 ± 0.030	0.329 ± 0.030

3.5 Brightness uniformity

The test standard conditions refer to Sec 4.3.
Set contrast control and brightness at the maximum, apply pattern as Fig.1, it should meet the following requirement:

$$\frac{\text{Min. luminance of nine points (backlight)}}{\text{Max. luminance of nine points (backlight)}} \geq 75\%$$



4. Input / Output Signal Specifications

4.1 Signal Interface

Items	Condition	Spec	OK	Note
Signal Cable	15 pin D-Sub	Color: Gray Length: 1800 +/- 20 mm	●	
	DVI	NA		
Analog	Signal type	Separate analog R,G,B	●	For 15 pin D-sub
	Level	700 mV +/- 5% (peak to peak)	●	
	Impedance	75 Ohms +/- 2% Ohms	●	
Sync	Signal type	Separate H/V-sync (Positive/Negative)	●	For 15 pin D-sub
	Level	Logic High: 2.0V ~ 5.5V Logic Low: 0V ~ 0.8V (TTL level)	●	Refer to VESA VSIS Standard V1R1
	Impedance	≧1.0K Ohm	●	1.0KΩ for application

4.2 Signal Timing

Through D-SUB connectors, this unit can support F_H= 31.5 ~ 80 KHz, Fv=56 ~ 75Hz and SXGA display modes as below:

Resolution	H-Freq. (kHz)	V-Freq. (Hz)	Dot Clock (MHz)	Mode
640 x 480	31.5	60.0	25.175	VESA IBM-AT Compatible machine PC-9800 series
	37.9	72.0	31.500	
	37.5	75.0	31.500	
800 x 600	35.1	56.0	36.000	
	37.9	60.0	40.000	
	48.1	72.0	50.000	
	46.9	75.0	49.500	
1024 x 768	48.4	60.0	65.000	
	56.5	70.0	75.000	
	60.0	75.0	78.750	
1280 x 1024	64.0	60.0	108.000	
	80.0	75.0	135.000	
640 x 350	31.5	70.0	25.175	US/IBM Text
720 x 400	31.5	70.0	28.322	
832 x 624	49.7	74.6	57.283	Power Macintosh series
1024 x 768	60.2	75.0	80.000	
	48.8	60.0	64.000	

4.3 Timing Requirements

Item	Condition	Specification
Horizontal	Sync polarity: (+) or (-)	31.5 ~ 80 KHz.
Vertical	Sync polarity: (+) or (-)	56-75Hz
Out of range	Excluding Horizontal 31.5~80 KHz or Vertical 56-75 Hz	Message “Input Not Supported” on screen
Cable not connect	No VGA cable	Message ‘’No Signal’’ on screen

4.4 DDC Data

EDID Standard Compliance

EDID File Format: VESA's EDID Standard Version #3, Revision #0,

EDID Structure : Version #1, Revision #3.

EDID Data Table : See the attached table (for example)

EDID Table

For InnoLux MT170EN01_VC Pane

4.1.1 V173 VGA EDID table (INL VC 17' Panel)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	04	72	19	00	00	00	00	00
1	00	00	01	03	08	22	1B	78	EA	DC	55	A3	59	48	9E	24
2	11	50	54	BF	EF	00	01	01	01	01	01	01	01	01	01	01
3	01	01	01	01	01	01	30	2A	00	98	51	00	2A	40	30	70
4	13	00	52	0E	11	00	00	1E	00	00	00	FD	00	38	4B	1E
5	53	0E	00	0A	20	20	20	20	20	20	00	00	00	FF	00	30
6	30	30	30	30	30	30	30	30	30	30	30	0A	00	00	00	FC
7	00	56	31	37	33	0A	20	20	20	20	20	20	20	20	00	CS

4.1.2 V173 DVI EDID table (INL VC 17' Panel)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	04	72	19	00	00	00	00	00
1	00	00	01	03	80	22	1B	78	EA	DC	55	A3	59	48	9E	24
2	11	50	54	BF	EF	00	01	01	01	01	01	01	01	01	01	01
3	01	01	01	01	01	01	30	2A	00	98	51	00	2A	40	30	70
4	13	00	52	0E	11	00	00	1E	00	00	00	FD	00	38	4B	1E
5	53	0E	00	0A	20	20	20	20	20	20	00	00	00	FF	00	30
6	30	30	30	30	30	30	30	30	30	30	30	0A	00	00	00	FC
7	00	56	31	37	33	0A	20	20	20	20	20	20	20	20	00	CS

5. Function Specifications

5.1 Panel General Specifications

All the tests to verify specifications in this section shall be performed under the following standard conditions unless otherwise noted. The standard conditions are:

Temperature : 25 ± 5°C

AC line input voltage : 110Vac / 60Hz or 220Vac / 50Hz.

Warm-up time : 30 minutes minimum

Checking display modes : All the specified modes

5.1.1 General Specifications

Panel Source	**INNOLUX`**
Model name	MT170EN01_VC
Display Area	337.9(H) X 270.3(V)
Pixel Pitch	0.264x0.264
Display Colors	16.2 Million (each 6-bit + 2-bit FRC)

Number of Pixel	1280x1024 pixels
Pixel Arrangement	RGB vertical stripe
Brightness	300cd/m2 (Typ.) 250cd/m2 (Min.)
Contrast Ratio	800:1(Typ.) 600:1(Min.)
Viewing Angle	Hor:160°, Ver: 160°(Typ., CR>=10)
Display Mode	Normally White
Frame rate	75Hz
Response Time	Tr + Tf = 5ms Typical
Surface Treatment	Hard coating (3H), Anti-glare treatment
Lamp	x 4
Outline Dimension	358.5(W)x296.5(H)x17.0(D)

5.1.2 LCD Module Defects

LCD module defects check follow to the IIS.

5.2 Keypad Function

5.2.1 Control buttons on the front bezel

CONTROL KEY	KEYS FUNCTION
[AUTO]	A. When OSD un-displays, press [AUTO] to perform auto-adjustment B. When OSD displays, press [AUTO] to return to previous level menu C. When “e Color OSD” OSD displays, press [AUTO] to exit the OSD
[MENU]	A. When OSD isn’t shown on screen, press [MENU] to enter OSD interface. The OSD interface uses “ACER e Color Management” and “User” to instead “Contrast” and “Brightness” separately. When press “ACER e Color Management” to show “e Color OSD”, and press “User” to show OSD interface before. The translations of “ACER e Color Management” and “User” are always English. B. When OSD displays, press [MENU] to perform function of menu icon that is highlight or enter next level menu
[►], [◄]	A. When “MENU OSD” displays, press these keys to change the contents of an adjustment item, or change an adjustment value B. When “MENU OSD” un-displays, if it is with audio, press [►] to show “Audio” OSD and increase the volume, press [◄] to show “Audio” OSD and decrease the volume; else it has no use to press these keys.
[e Color]	A. When OSD un-displays, press [e Color] to show “e Color OSD”, and press again the OSD can not disappear, but the time of “e Color OSD” disappearing is reset 10 second again. B. When OSD disappear not including “e Color OSD”, press [e Color] to show “e Color OSD” OSD, the OSD before disappears, but the parameters of it should be saved
[POWER]	Power on or power off the monitor

5.2.2 Hot Key Operation

FUNCTION	HOT KEY OPERATION						DESCRIPTION
	e-Color	AUTO	◄	►	MENU	POWER	
FACTORY MODE	●				●	ON	Press [E-Color] & [MENU] at the same time, and then press [POWER] for DC power on. OSD menu will be shown with "F" on the left top. Select "F" for entering factory mode.

5.3 OSD Structure

The On-Screen Display (OSD) shall be an easy to use icon based menu through keypad OSD buttons or remote control unit. The unit shall leave the factory with all OSD controls set to their default values.

First	Second		Third	Control Range	Default Value	
Brightness	ACER e COLOR Management		Empowering Technology			
	User		Contrast		User mode	50
					Text mode	50
					Standard mode	50
					Graphics mode	60
					Movie mode	56
			Brightness		User mode	77
					Text mode	44
					Standard mode	77
					Graphics mode	97
					Movie mode	77
			ACM		OFF	
Image	Focus		---	0 ~ 100	Depend on each timing	
	Clock		---	0 ~ 100	50	
Position	Horizontal		---	0 ~ 100	50	
	Vertical		---	0 ~ 100	Depend on each timing	
Color	Warm (6500K)		---	---		
	Cool (9300K)		---	---		
	User		Red	0 ~ 100	80	
			Green	0 ~ 100	80	
			Blue	0 ~ 100	80	
Language	**NO-EMEA**	**EMEA**				
	English	English	---	---	English	
	Deutsch	Deutsch	---	---		
	Español	Español	---	---		
	简体中文	Hollands	---	---		
	繁體中文	Русский	---	---		
	Français	Français	---	---		
	Italiano	Italiano	---	---		

	日本語	Suomalain	---	---	
OSD	Hor. Position		---	0 ~ 100	50
	Ver. Position		---	0 ~ 100	50
	OSD Timeout		---	10~ 120	20
Input (Dual)	Analog		---	---	---
	Digital		---	---	---
	DDCCI ON/OFF				ON
Input (Analg only)	DDCCI ON/OFF				ON
Info	Resolution		---	---	---
	H. Freq		---	---	---
	V. Freq		---	---	---
	S/N				ETL000….0000(22)
Reset	---		---	---	---
Exit	---		---	---	---

Notes: 1. Clock default 50 is for Visa timing. Others depend on timing.

5.3.1 OSD Function Test

3.1.1 Test mode: 1280x1024 @ 60 Hz

3.1.2 Test pattern: pattern #1 of crosshatch (GENERAL-1)

3.1.3 Check single key function and hot key function about key “Power”, “Menu”,” ►”, “◄ “, “Exit/Auto”, “**[e Color]**” it should operate normally

5.3.2 Screen Picture Check

5.3.3 Test mode: 1280x1024 @ 60 Hz

5.3.4 Test pattern: pattern #1 of crosshatch (GENERAL-1)

5.3.5 Select OSD menu to execute ‘Auto’ function, screen picture shouldn’t appear abnormal phenomenon and picture on screen should fit in with active display screen.

5.4 Auto Color Balance

5.4.1 Test mode: 640X480 @ 60 Hz

5.4.2 Test pattern: pattern #42 of 5 mosaic pattern

5.4.3 Enter "Factory Mode" pressing "MENU" key, execute "AUTO".

5.4.4 When Color Balance finished, Must push “POWER” key to exit “Factory mode”, and restart.

5.5 Timing Check

5.5.1 Test mode: Refer to preset timing table and power saving mode

5.5.2 Test pattern: pattern #1 of crosshatch (GENERAL-1)

5.5.3 After change above timing and execute “Auto” function automatically, picture should fit in with active display screen.

5.5.4 Under power saving mode, LED lamp on the key board should be orange

5.6 Power Consumption Function Test

5.6.1 Test mode: 1280x1024 @ 60 Hz

5.6.2 Test pattern: pattern #41 of “WHITE”

5.6.3 Adjusting both brightness value to maximum,

5.6.4 Measure power consumption as the following

Status	Power Consumption	LED Display
Normal	< 35W	Green

Standby (No H/V sync)	< 1W	Orange
Power off	< 1W	No display

5.7 VGA Cable Detect Test

If VGA cable of LCD monitor isn't connected to video pattern generator or PC, "NO SIGNAL" should be shown on screen.

5.8 Hi-Pot test

Test condition:

a. high voltage 2.3KV(DC)
b. leakage current 10mA
c. rising time 1 sec.
d. test time 3 sec.

5.9 Grounding Test

Test condition:

a. test current 30A / 2 sec
b. impedance < 0.1Ω

5.10 Bumping Test

5.10.1 Test mode: 1280x1024 @ 60 Hz;

5.10.2 Test pattern: pattern #1 of crosshatch (GENERAL-1)

5.10.3 To shock LCD monitor lightly at the center of rear cover and edges with 1~2kg/cm2 force for three times, no abnormal phenomenon is found on panel screen.

6. DISPLAY CHECK

6.1 Panel Flicker Check

Connect LCD monitor to PC, set LCD monitor to be timing of 1280x1024@60 Hz, adjust brightness to be default value (brightness at maximum), execute "Auto" function, and then check picture of shut down under windows operating system, or flicker-pattern of pixel on-off. It should be that no flicker be found on panel screen.

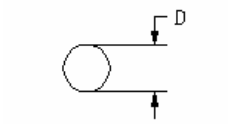
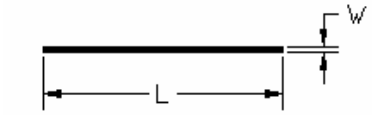
6.2 Panel Defect Inspection

6.2.1 Test mode: 1280 x 1024@60Hz
6.2.2 Test pattern: Crosshatch/Full white/Red/Green/Blue/Black/16 color bar/64 gray bars
6.2.3 Display quality must be (according to DIN 13406-2 pixel fault class II)

Defect Type	Specification	Major	Minor
Bright Dots	N≤2 (For AMLCD)		●
	N ≤ 3 (For LPL and INL)		●
	N≤4 (green=0) (For CPT)		●
Dark Dots	N≤5 (For AMLCD)		●
	N ≤ 4 (For CPT & LPL & INL)		
Total Bright and Dark Dots	N ≤ 5 (For AMLCD, LPL & INL)		●
	N ≤ 4 (For CPT)		●
Bright Dots – 2 Adjacent	N ≤ 1 pair (For LPL & INL)		●
	N ≤ 2 pair (For AMLCD & CPT)		●
Bright Dots – 3 or more Adjacent	N ≤ 0 pair		●
Dark Dots – 2 Adjacent	N ≤ 2 pair		●
Dark Dots – 3 or more Adjacent	N ≤ 1 pair (For AMLCD)		●
	N ≤ 0 pair (For AMLCD, LPL & INL)		

Distance between Bright dots	L ≥ 15 mm		●
Distance between Dark dots	L ≥ 15 mm		●

Note 1: Dot defect is defined as the defective area is not larger than 50% of the dot area. Bright Dot is defined 5% transmission ND filter.
Note 2: Light Leakage: There shall not be visible light around the customer's bezel after assembly in normal View angle.

Defect Type		**Specification Size**	**Count (N)**	**Major**	**Minor**
Dot Shape (Particle、Scratch and Bubbles in Display area or on The Polarizer) 		Black spots which appear when B/L operating 0.1 ≤ D ≤ 0.7 mm (AMLCD) 0.15 ≤ D ≤ 0.5 mm (CPT & LPL) 0.05 ≤ D ≤ 0.15 mm (INL)	 N ≤ 4 N ≤ 4 N ≤ 3		●
Line Shape (Particles, Scratch, Fiber and Bubbles in display area or on The Polarizer) 		0.3mm ≤ L ≤ 5.0mm 0.01≤W≤0.1mm	N ≤3 (for Sam)		●
		1mm ≤ L ≤ 10mm 0.01≤W≤0.05mm	N ≤4 (for LPL)		
		L ≤3mm W ≤ 0.1 mm	N ≤4 (for CPT)		●
		0.3mm ≤ L ≤ 10mm 0.05mm ≤ W ≤ 0.15 mm	N ≤4 (For INL)		
Display non-uniformity		There should be non-uniformity through 5% transparency of filter or judge by limit sample if necessary.			●
Bezel	Scratch	No harm			●
	Dirt				●
	Wrap	No harm			●
	Sunken	No harm			●
Label	No label	No			●
	Invert label				●
	Broken				●
	Dirt	Word can be read.			●
	Not clear				●
	Word out of shape				●
	Mistake	No			●
	Position	Be attached on right position			●
Screw	Not enough	No			●
	Limp	No			●
Connector	Connection status	No bend on pins and damage			●
FPC/FFC	Broken	No			●

7. SOP of firmware upgrade (Manufacturer of Scaler is RealTek)

7.1 Operational condition:

Equipment: PC, ISP card, signal cable and power cable.

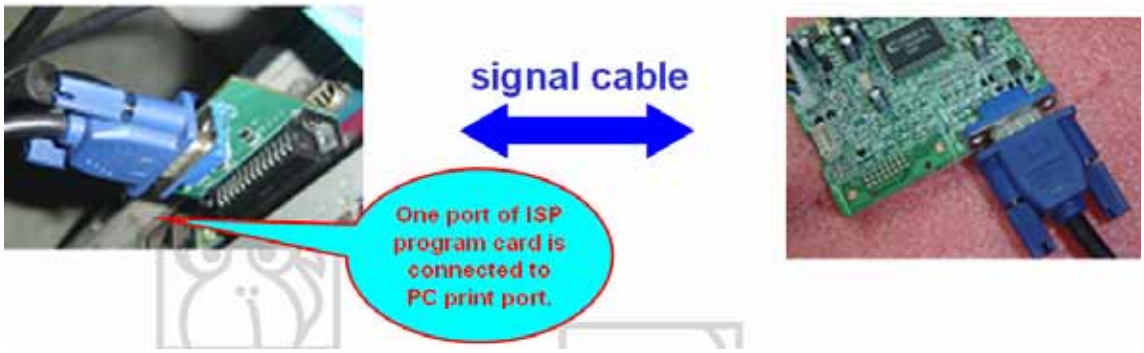
ESD requirements: antistatic wrists, antistatic gloves (fingers), and connecting cable

Name of ISP program: RTDTool_4.6.exe

Manufacture of FW IC：RTD 2525L

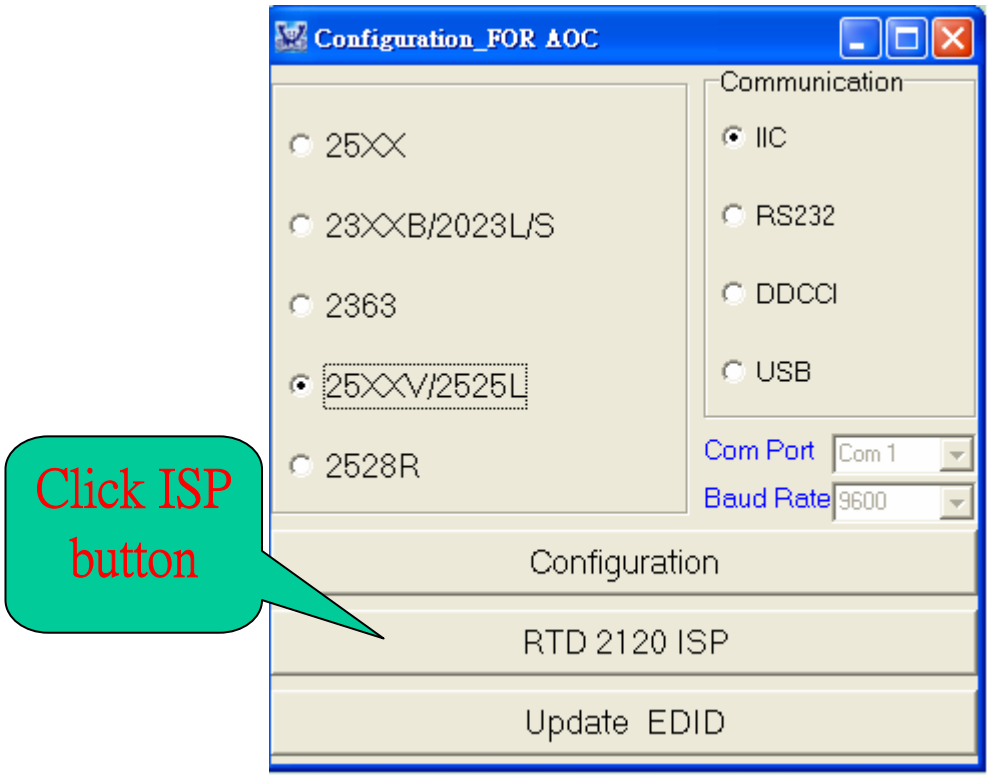
7.2 Operational steps:

1. Connection: connect PC to PCBA with signal cable, and then keep AC and DC in open state

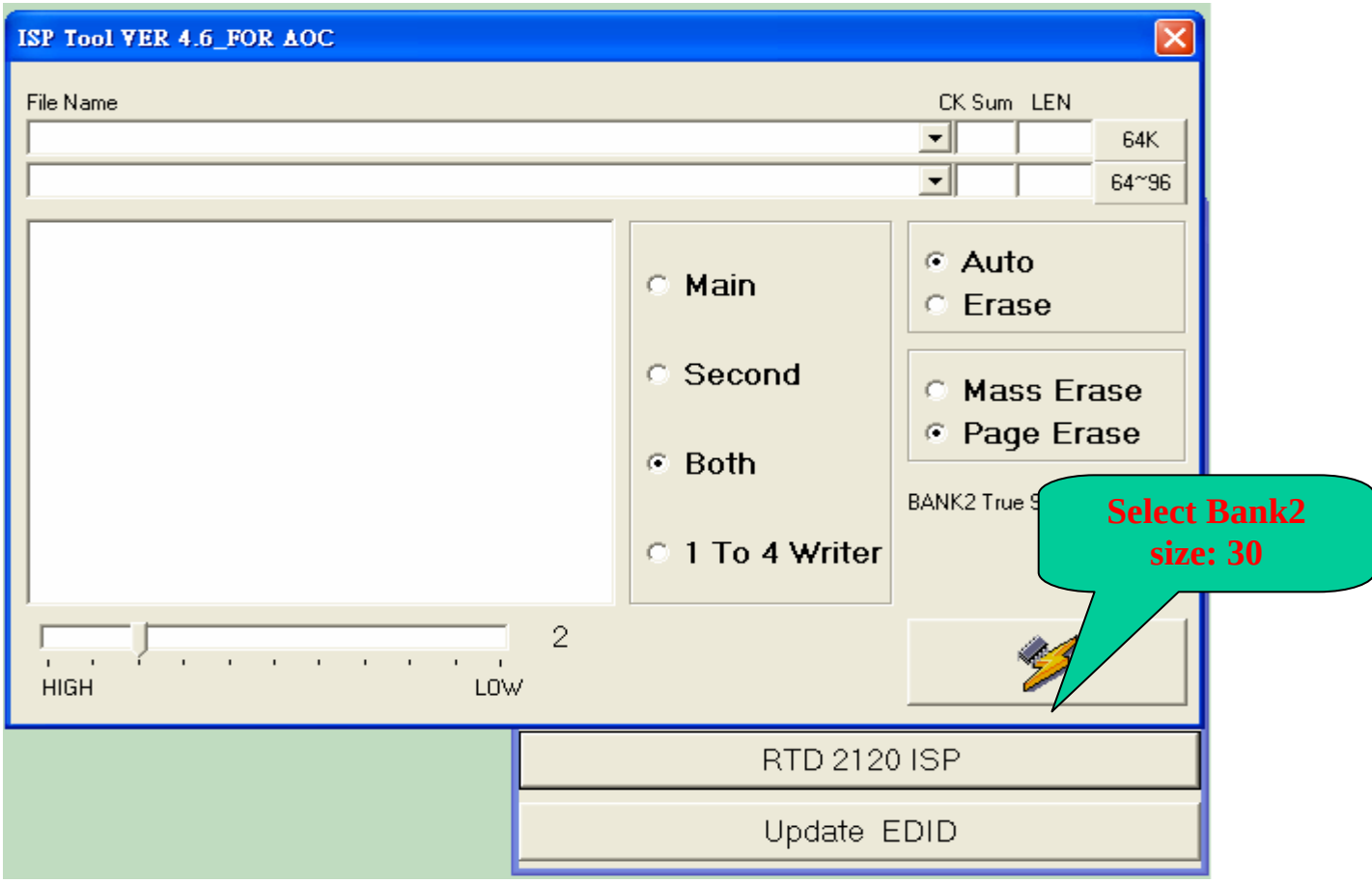


2. Adjust ISP programming

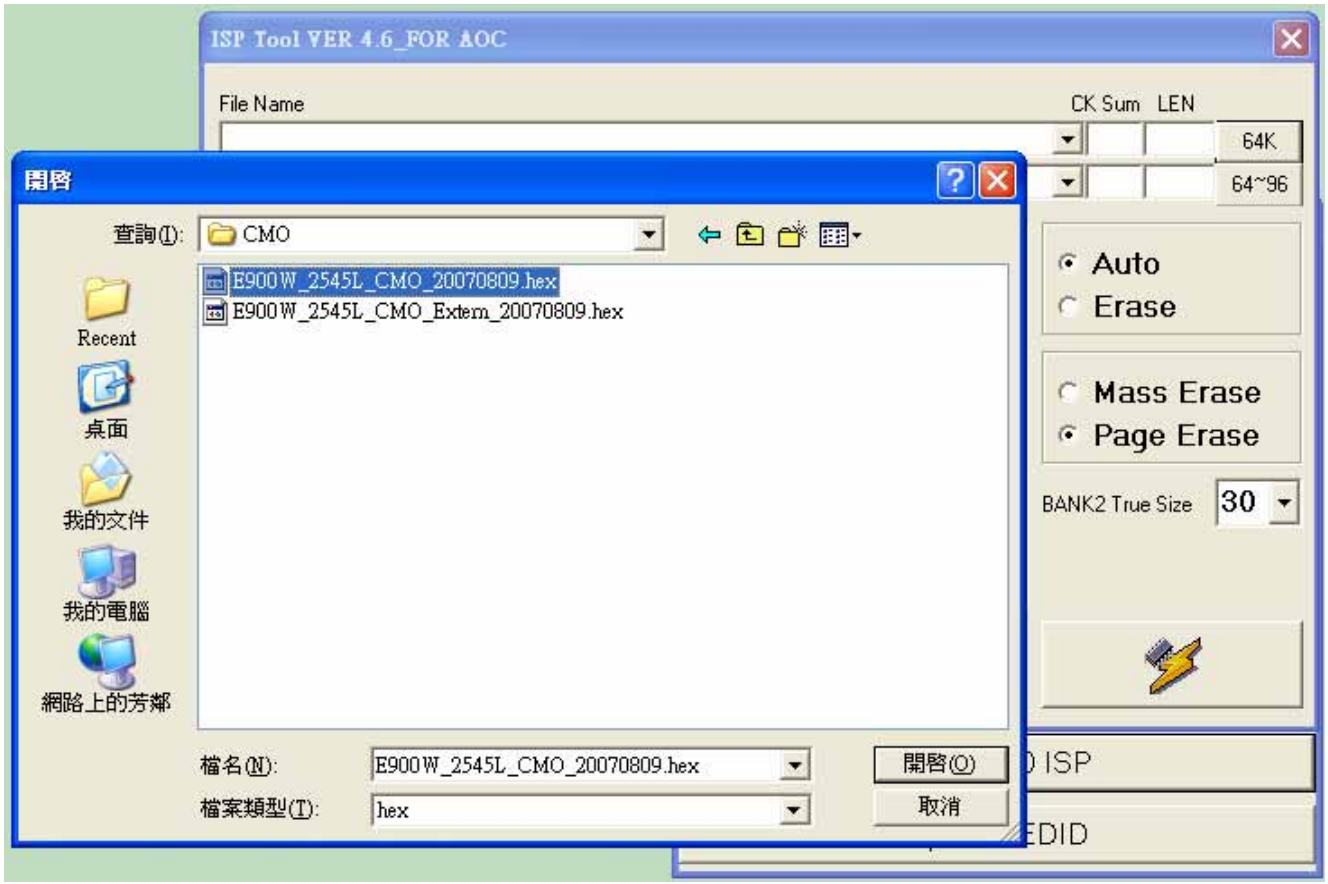
Firstly, double click RTDTool_4.6.exe and open ISP program, then select “25XXV/2525L”, and RTD 2120 ISP button.



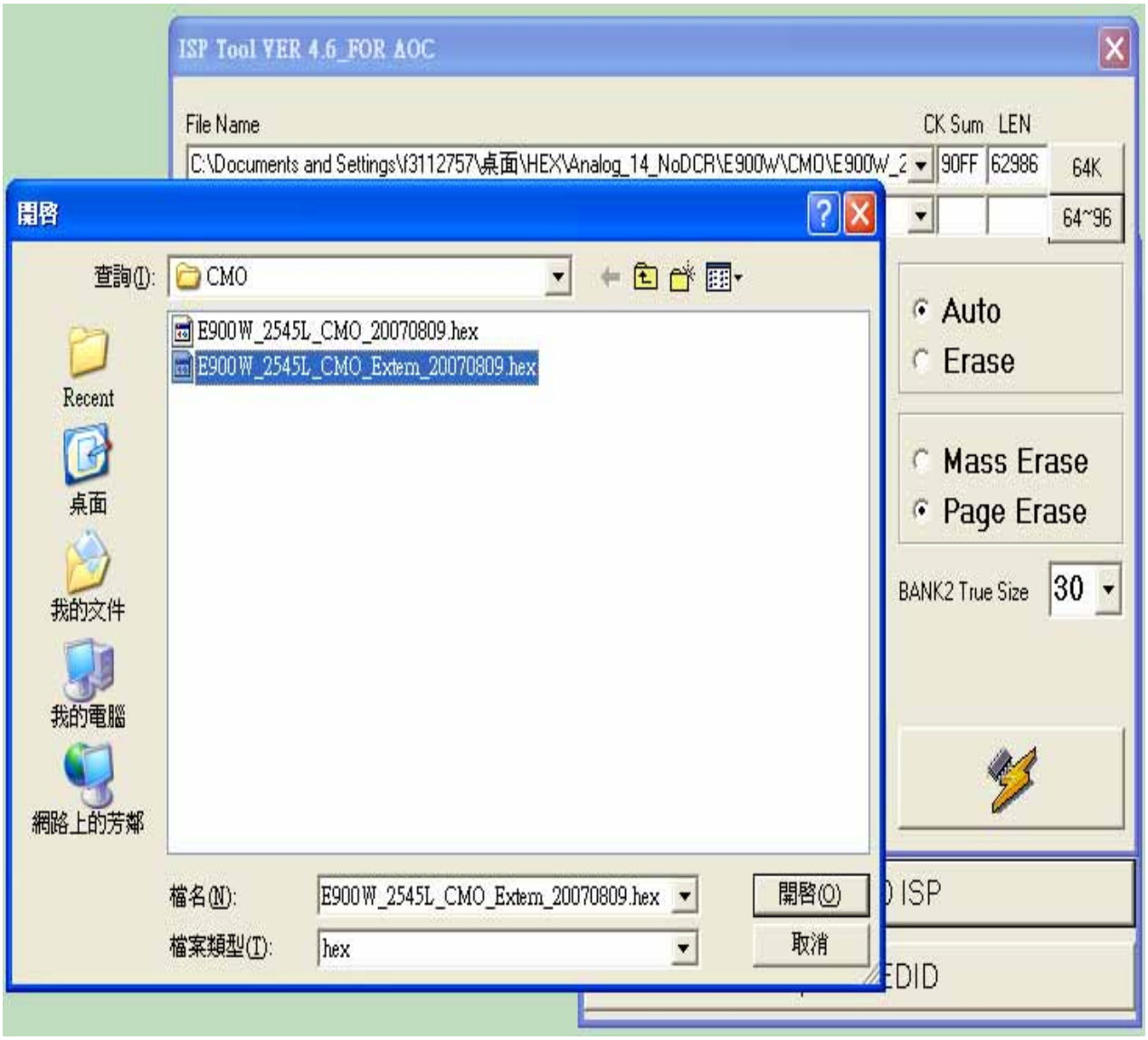
Secondly，select Bank2 size which is 30.



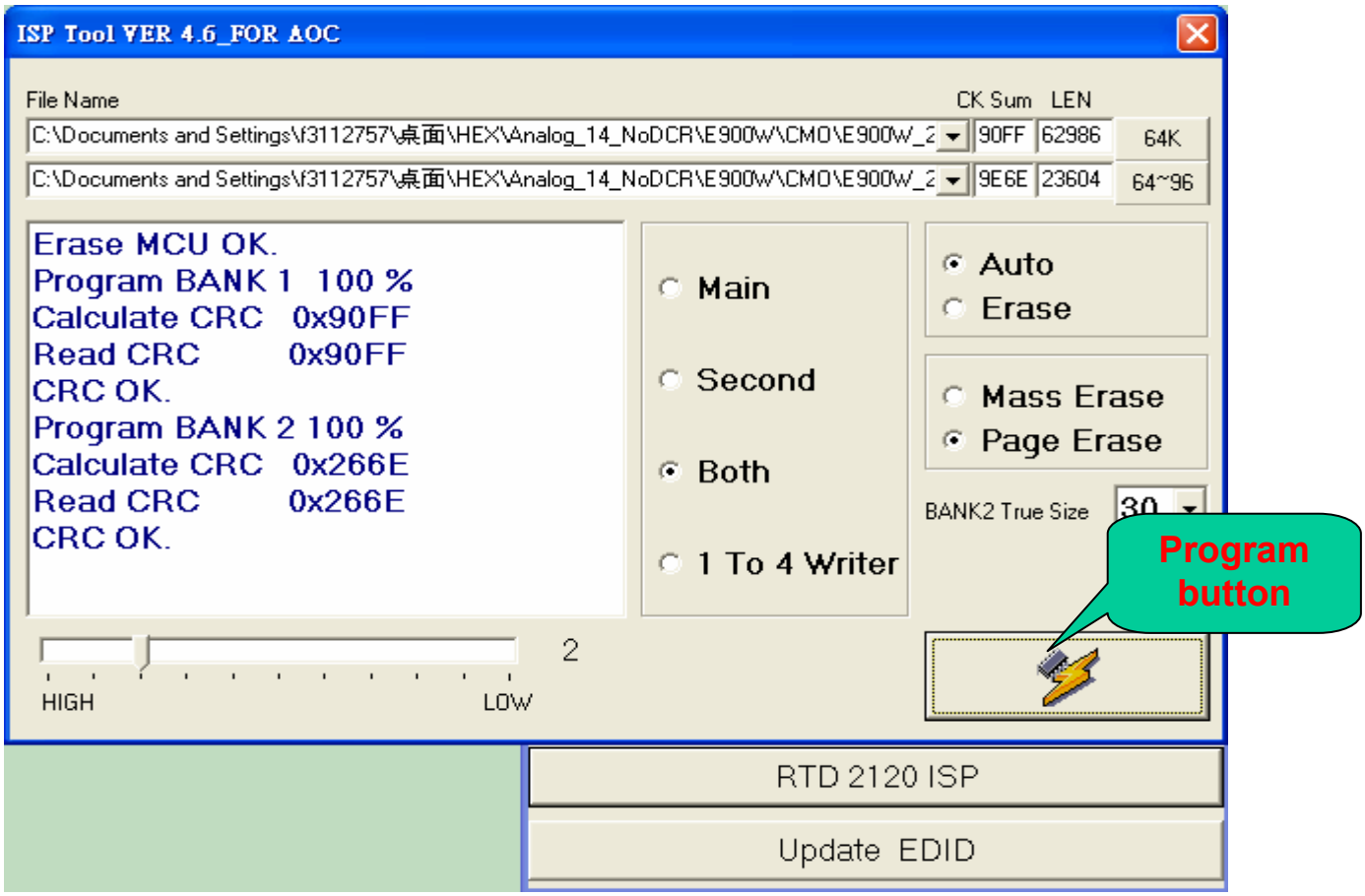
Thirdly, click “64K”button and download FW file as below Figure 3.



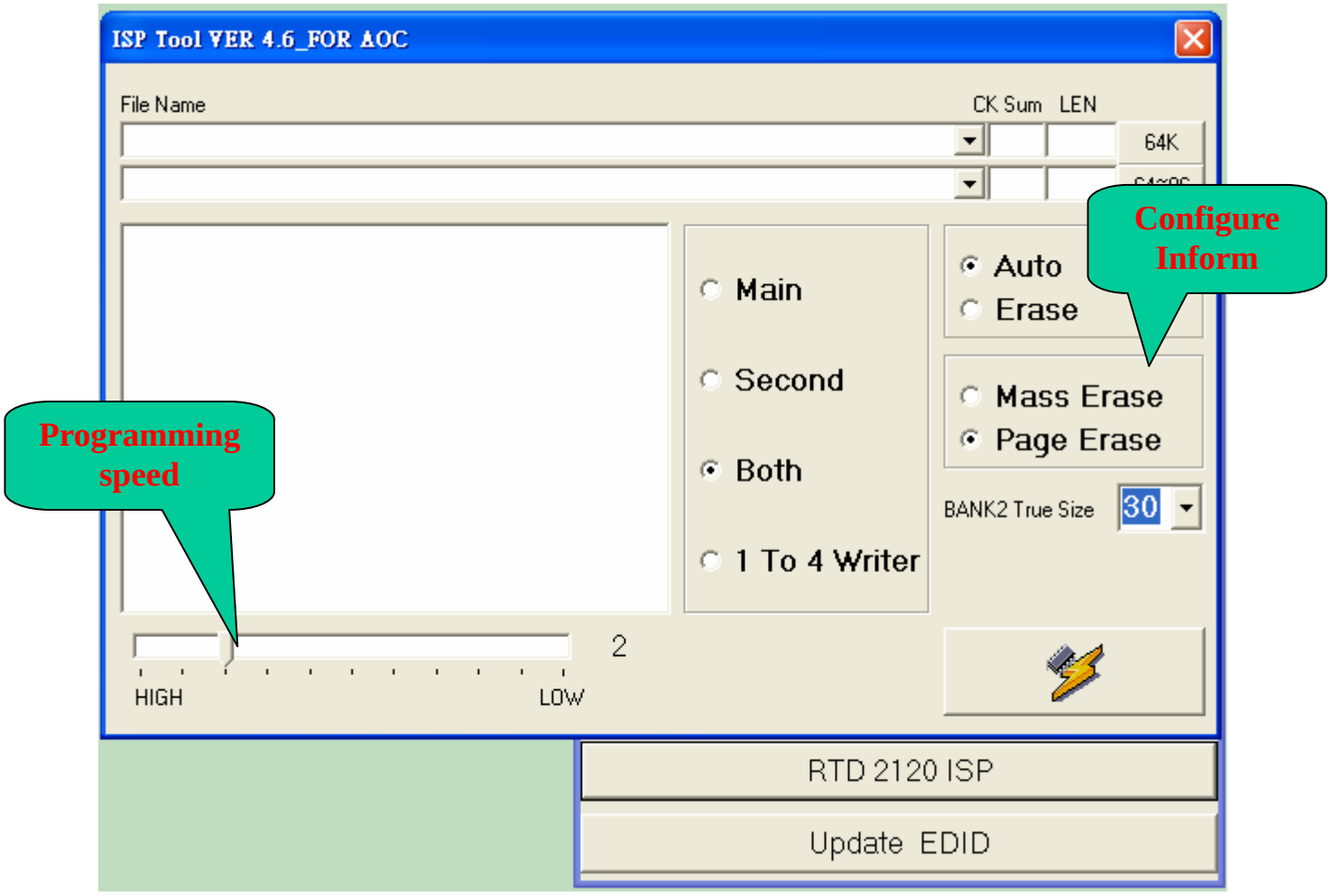
Fourthly, click “64~96”button, and download extern FW file as below Figure 4 .

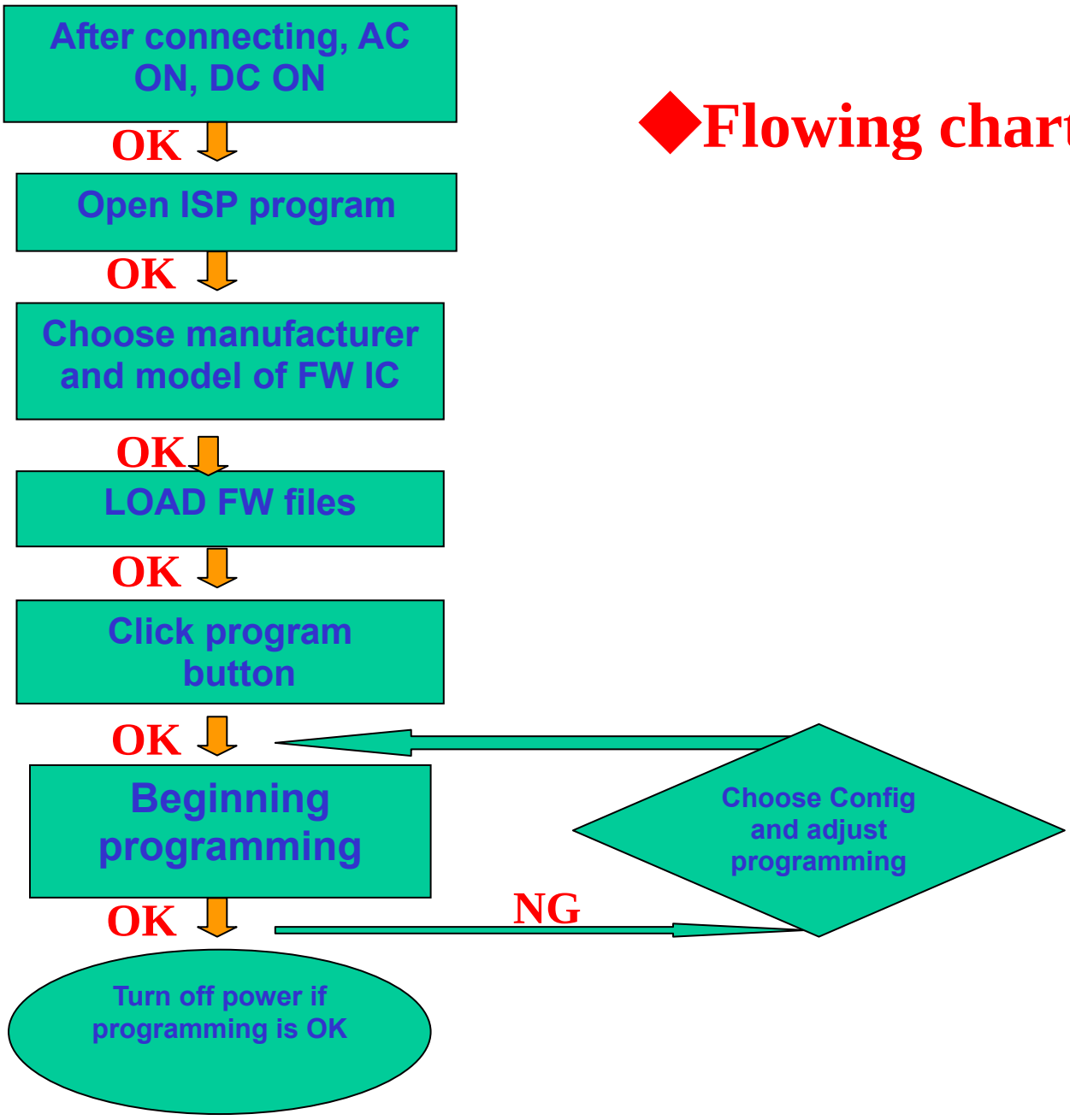


Fifthly, click“program”button as below, then you will see ISP will going on. There will be prompting if programming is OK.



Note: Please see the configure as below Figure 6.

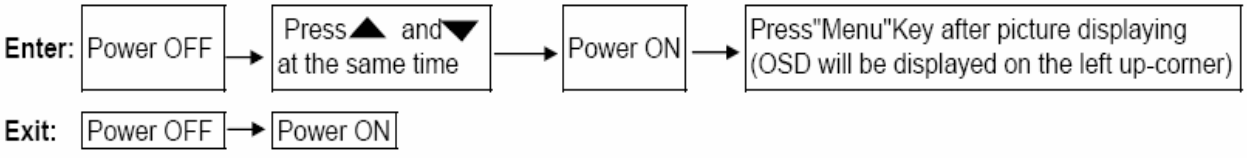




◆Flowing chart

7.3 Factory Mode

FUNCTION	HOT KEY OPERATION						
	AUTO	e Color	◄	►	MENU	POWER	
FACTORY MODE		●			●	ON	Press [e Color] & [MENU] at the same time, and then press [POWER] for DC power on. OSD menu will be shown with "F" on the left top. Select "F" for entering factory mode.



02. Flat Panel Specification

A. General specification

NO.	Item	Specification	Remark
1	Display resolution (pixel)	1280(H) X 1024(V), SXGA resolution	
2	Active area (mm)	337.92(H) X 270.336(V)	
3	Screen size (inch)	17 inches diagonal	
4	Pixel pitch (mm)	0.264(H) X 0.264(V)	
5	Color configuration	R, G, B vertical stripe	
6	Overall dimension (mm)	358.5(W)x296.5(H)x16(D) (typ)	
7	Weight (g)	2000 (max)	
8	Surface treatment	Anti-glare, Haze = 25%, Hard coating (3H)	
9	Input color signal	8 bit LVDS	
10	Color saturation	72% NTSC	
11	Display colors	16.7M colors (6 bit with Hi-FRC)	
12	Optimum viewing direction	6 o'clock	
13	Backlight	4 CCFL, top & bottom edge side	
14	TCO'03 and RoHS	TCO'03 and RoHS compliance	

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B. Electrical specifications

1.Pin assignment

Connector JAE FI-X30SSL-HF or equivalent

Pin No	Symbol	Description
1	RxO0-	LVDS Differential data input Channel 0(-)
2	RxO0+	LVDS Differential data input Channel 0(+)
3	RxO1-	LVDS Differential data input Channel 1(-)
4	RxO1+	LVDS Differential data input Channel 1(+)
5	RxO2-	LVDS Differential data input Channel 2(-)
6	RxO2+	LVDS Differential data input Channel 2(+)
7	GND	Ground
8	RxOC-	LVDS Differential Clock input (-)
9	RxOC+	LVDS Differential Clock input (+)
10	RxO3-	LVDS Differential data input Channel 3(-)
11	RxO3+	LVDS Differential data input Channel 3(+)
12	RxE0-	LVDS Differential data input Channel 0(-)
13	RxE0+	LVDS Differential data input Channel 0(+)
14	GND	Ground
15	RxE1-	LVDS Differential data input Channel 1(-)
16	RxE1+	LVDS Differential data input Channel 1(+)
17	GND	Ground
18	RxE2-	LVDS Differential data input Channel 2(-)
19	RxE2+	LVDS Differential data input Channel 2(+)
20	RxEC-	LVDS Differential Clock input (-)
21	RxEC+	LVDS Differential Clock input (+)
22	RxE3-	LVDS Differential data input Channel 3(-)
23	RxE3+	LVDS Differential data input Channel 3(+)
24	GND	Ground
25	GND	Ground
26	GND	Ground or Open
27	GND	Ground
28	VCC	Power supply (+5.0V)
29	VCC	Power supply (+5.0V)
30	VCC	Power supply (+5.0V)

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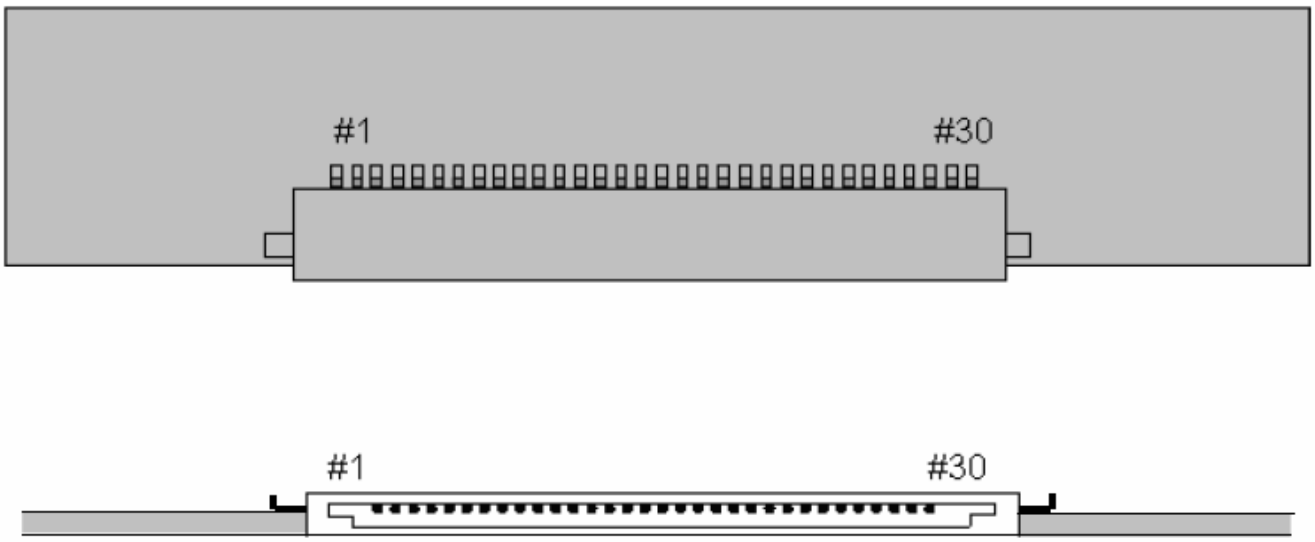

Rear view of LCM

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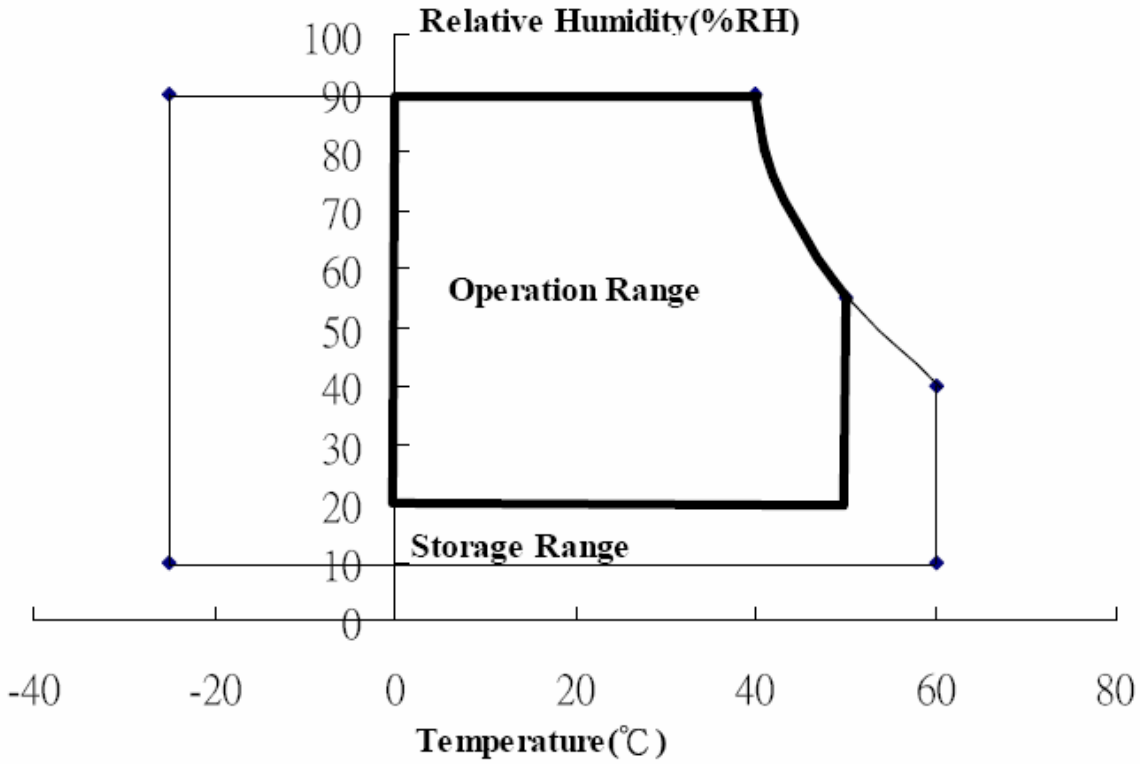
2. Absolute maximum ratings

Parameter	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	V_{cc}	- 0.3	6.0	V	At 25°C
Input signal voltage	V_{LH}	- 0.3	3.6	V	At 25°C
Operating temperature	Top	0	50	°C	Note 1
Storage temperature	T_{ST}	- 25	60	°C	Note 2
CCFL Current	ICFL	2	8	[mA] rms	

Note 1: The relative humidity must not exceed 90% non-condensing at temperatures of 40°C or less. At temperatures greater than 40°C, the wet bulb temperature must not exceed 39°C.
Note 2: The unit should not be exposed to corrosive chemicals.



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3. Electrical characteristics

a. Typical operating conditions

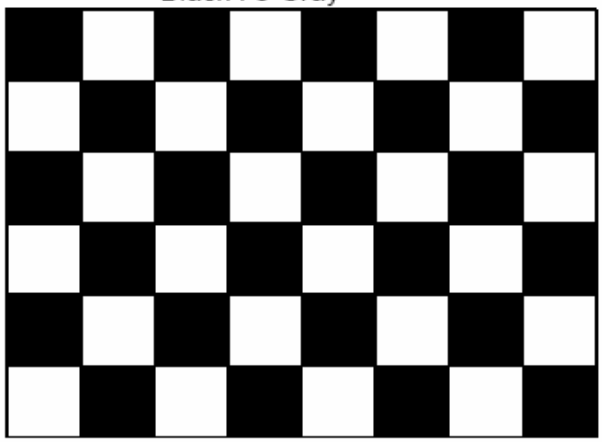
Item		Symbol	Min.	Typ.	Max.	Unit	Remark
Input Voltage		V_{cc}	4.5	5.0	5.5	V	
Permissive Power Input Ripple		V_{RF}		-	0.15	Vp-p	Note 1
Input Current		I_{cc}	-	0.7	0.95	A	Note 2
Differential Impedance		Z_m	90	100	110	ohm	
Rush Current		I_{Rush}	-	-	3.0	A	Note 3
Logic Input Voltage LVDS: IN+, IN-	Common Mode Voltage	VCM	1.125	1.25	1.375	V	
	Differential Input Voltage	VID	250	350	450	mV	
	Threshold Voltage (High)	VTH	-	-	100	mV	Note 4
	Threshold Voltage (Low)	VTL	-100			mV	Note 4

Note 1: Power input ripple should not exceed max. value.

Note 2: The specified current is under the V_{cc} =5V, 25 °C, f_V=60Hz (frame frequency) condition whereas mosaic pattern (black & white [8*6]) is displayed.

White : 255 Gray

Black : 0 Gray



mosaic pattern (black & white [8*6])

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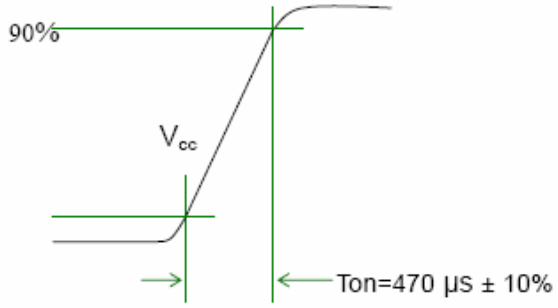
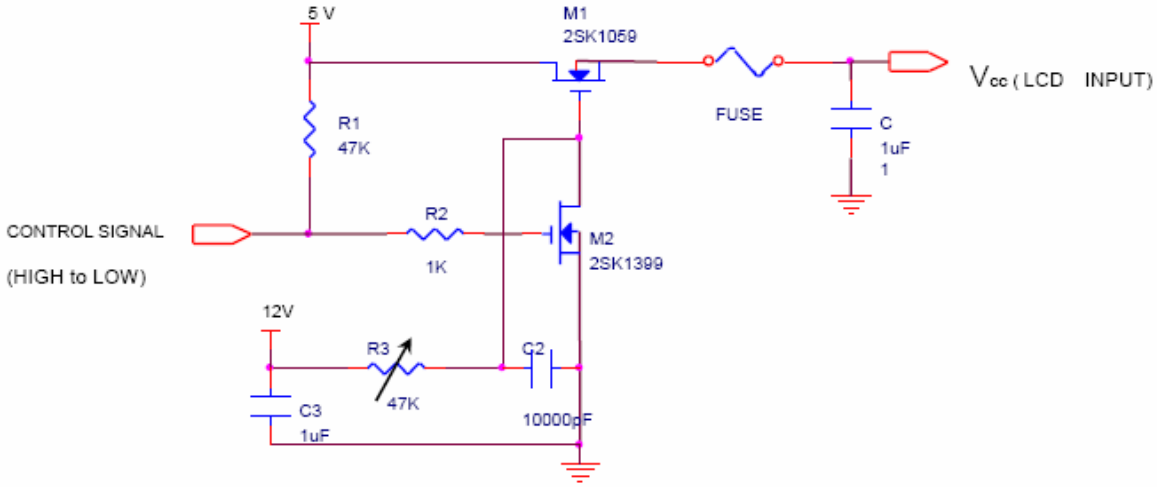
Note 3 : test condition :`

(1) V_{cc} = 5 V, V_{cc} rising time = 470 μs ± 10%

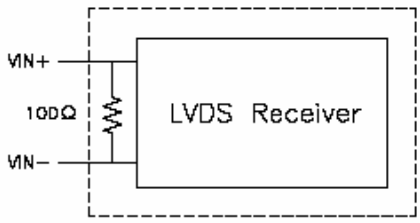
(2) Pattern: Mosaic pattern

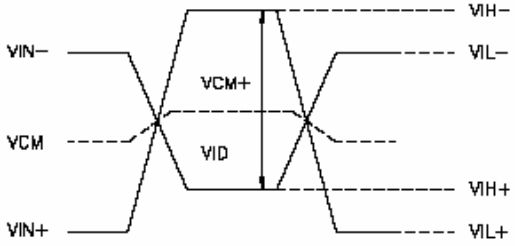


(3) Test circuit



Note 4 : LVDS signal definition





VID = VIN_+ – VIN- ,

△VCM = | VCM_+–VCM- | ,

△VID = | VID_+–VID- | ,

VID+ = | VIH_+–VIH- | ,

VID- = | VIL_+–VIL- | ,

VCM = (VIN_+ +VIN-)/2,

VCM+ = (VIH_+ +VIH-)/2,

VCM- = (VIL_+ +VIL-)/2,

VIN_+ = Positive differential DATA & CLK Input

VIN- = Negative differential DATA & CLK Input

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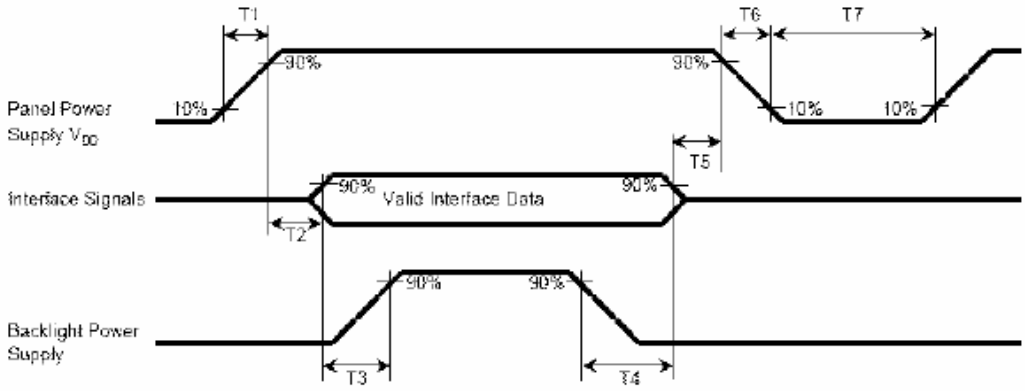
Note 5 : Power on sequence for LCD V_{cc}



Parameter	Value			Unit
	Min	Typ	Max	ms
T1	0.1	--	10	ms
T2	0	--	50	ms
T3	200	250	--	ms
T4	100	250	--	ms
T5	0	20	50	ms
T6	0.1	--	--	ms
T7	1000	--	--	ms

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b. Display color v.s. input data signals

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

Color		Input color data																							
		Red								Green								Blue							
		MSB							LSB	MSB							LSB	MSB							LSB
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Red	Red(000) dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(001)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(002)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255) bright	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green	Green(000)dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Green(002)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green(255)bright	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Blue	Blue(000) dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(002)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue(255) bright	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

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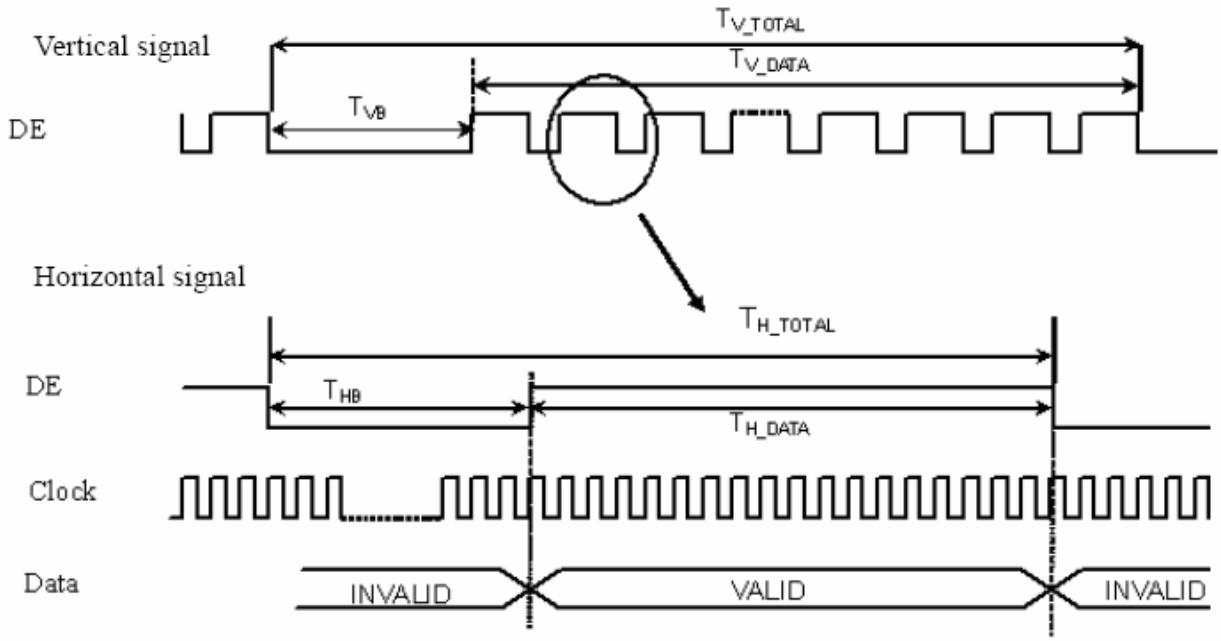
c. Input signal timing

Support Input Timing Table

	Item	Description	Min.	Typ.	Max.	Unit
Clock	Dclk	period	14.71	18.52	22.22	nS
		frequency	45	54	68	MHz
Vertical	T_{V_TOTAL}	V total line number	1044	1066	1100	T_{H_TOTAL}
	T_{V_DATA}	Data duration	—	1024	—	T_{H_TOTAL}
	T_{VB}	V-blank	20	42		T_{H_TOTAL}
	f_V	frequency	50	60	75	Hz
Horizontal	T_{H_TOTAL}	H total pixel number	790	844	880	DClk
	T_{H_DATA}	Data duration	—	640	—	DClk
	T_{HB}	H-blank	150	204		DClk



Note : DE is reference signal, DE means the display data valid.

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d. Display Position

D(1, 1)	D(2, 1)	……	D(640, 1)	……	D(1279, 1)	D(1280, 1)
D(1, 2)	D(2, 2)	……	D(640, 2)	……	D(1279, 2)	D(1280, 2)
⋮		……	⋮	……	⋮	⋮
D(1, 512)	D(2, 512)	……	D(640, 512)	……	D(1279, 512)	D(1280, 512)
⋮		……	⋮	……	⋮	⋮
D(1, 1023)	D(2, 1023)	……	D(640, 1023)	……	D(1279, 1023)	D(1280, 1023)
D(1, 1024)	D(2, 1024)	……	D(640, 1024)	……	D(1279, 1024)	D(1280, 1024)

e. Backlight driving conditions

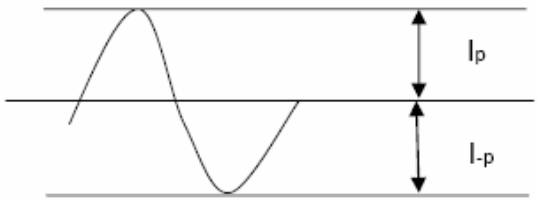
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark	Remark
Lamp voltage	VL	549	610	671	Vrms	@7mA	
Lamp operation current	IL	3	7	8	mArms		Note 1
Lamp starting voltage	VLstart	1040			Vrms	T = 25˚C	Note 2,3,4,5
		1360				T = 0˚C	Note 2,3,4,5
Frequency	F	40	55	80	KHZ		Note 5
Lamp life time		50000			Hr		Note 6

Note: The waveform of the voltage output of inverter must be area-symmetric and the design of the inverter must have specifications for the modularized lamp. The performance of the Backlight, such as lifetime or brightness, is greatly influenced by the characteristics of the DC-AC inverter for the lamp. All the parameters of an inverter should be carefully designed to avoid producing too much current leakage from high voltage output of the inverter. When designing or ordering the inverter please make sure that a poor lighting caused by the mismatch of the Backlight and the inverter (miss-lighting, flicker, etc.) never occurs. If the above situation is confirmed, the module should be operated in the same manners when it is installed in your instrument.

Note 1 :

The degrees of unbalance: less than 10%

The ratio of wave height: less than $\sqrt{2} \pm 10\%$



Ip: high side

I-p: low side

The degrees of umbalance =$|I_p - I_{-p}|$ /Irms *100(%)

The ratio of wave height = Ip(or I-p)/Irms

Lamp should be completely turned on.

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Note 2:

Test equipment: AS-114B, Output Capacitor =15pF, f=46KHz

Note 3:

The voltage shown above should be applied to the lamp for more than 1 second after startup. Otherwise, the lamp may not be turned on normally.

Note 4:

Inverter should provide more than min. value, and then lamp could be completely turned on

Note 5:

Lamp frequency may produce interference with horizontal synchronous frequency and this may cause line flow on the display. Therefore lamp frequency shall be detached from the horizontal synchronous frequency and its harmonics as far as possible in order to avoid interference.

Note 6:

Lamp life definition:

The brightness of lamp becomes 50% of the initial brightness or not normal lighting.

Backlight connecter : 35001HS-02L

Pin no.	Symbol	Function	Remark
1	VIH	Lamp high voltage input	Cable color: Pink、Blue
2	VIL	Lamp low voltage input	Cable color: White、Black

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C. Optical specifications

Item	Symbol	Condition	Specification			Unit	Remark
			Min.	Typ.	Max.		
Response time	Tr	θ= 0°		1	4	ms	Note 4
	Tf			4	6		
	Tr+Tf			5	10		
Contrast ratio	CR	θ= 0°	700	1000			Note 3,5
Viewing angle	Top	CR≧10	70	80		deg	Note 3,5,7
		CR≧5	75	85			
	Bottom	CR≧10	70	80			
		CR≧5	75	85			
	Left	CR≧10	70	80			
		CR≧5	75	85			
	Right	CR≧10	70	80			
		CR≧5	75	85			
Brightness (Center)	Y_L		250	300		nit	Note 3,6
Color chromaticity(CIE)	Wx	θ= 0°	-0.03	0.313	+0.03		Note 3
	Wy			0.329			
	Rx			0.640			
	Ry			0.349			
	Gx			0.284			
	Gy			0.617			
	Bx			0.142			
	By			0.067			
White uniformity (9)	δ_W		0.75	0.8			Note 3,8
Cross talk	Ct				2%		Note 9

Note 1: Ambient temperature = 25°C.

Note 2: To be measured in dark room after backlight warm up 30 minutes.

Note 3: To be measured with a viewing cone of 2°by Topcon luminance meter BM-5A.

Note 4: Definition of response time:

The output signals of BM-7 are measured when the input signals are changed from “Black” to “White” (falling time) and from “White” to “Black” (rising time), respectively. The response time interval between the 10% and 90% of amplitudes. Refer to figure as below.

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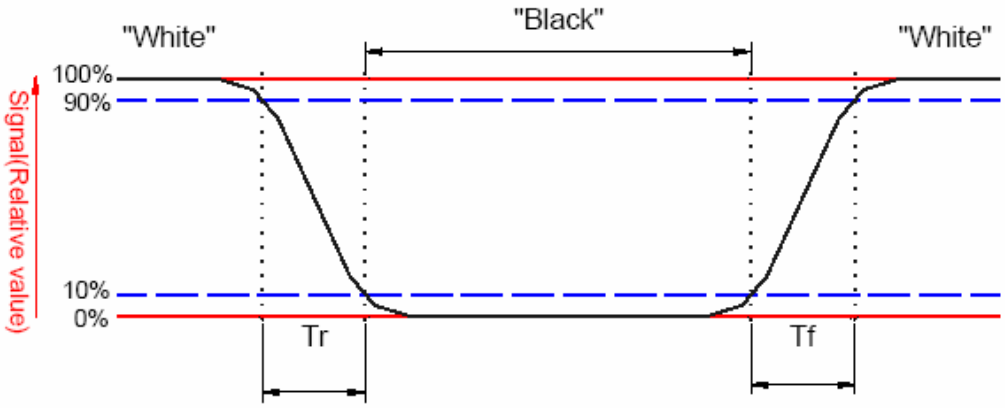


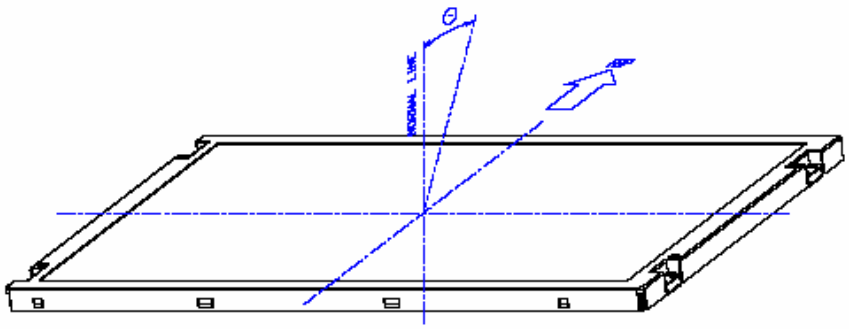
Note 5. Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

Note 6: Driving conditions for CCFL: I_L= 7.0 mA, 50 KHz Frequency.

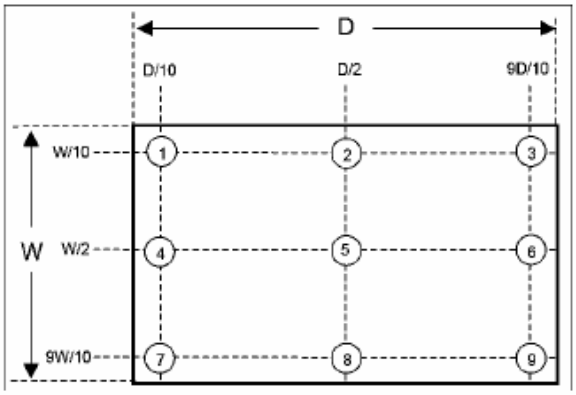
Note 7: Definition of viewing angle



Note 8: Definition white uniformity:

Luminance are measured at the following nine points (1~9).

$$\delta_W = \frac{\text{Minimum Brightness of nine points}}{\text{Maximum Brightness of nine points}}$$



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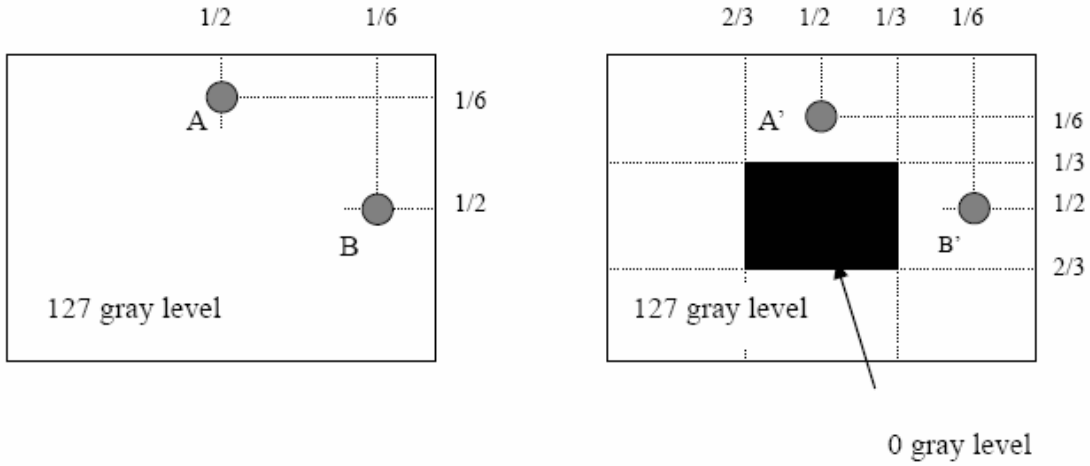
Note 9:

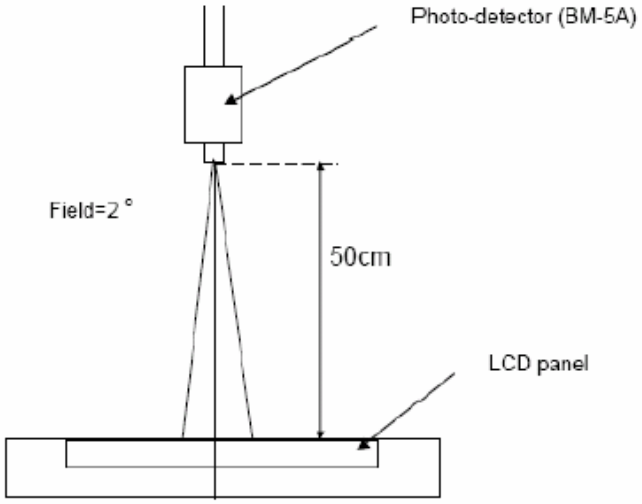


Unit: percentage of dimension of display area

$| L_A - L_{A'} | / L_A \times 100\% = 2\%$ max., L_A and $L_{A'}$ are brightness at location A and A'

$| L_B - L_{B'} | / L_B \times 100\% = 2\%$ max., L_B and $L_{B'}$ are brightness at location B and B'

Note 10: Optical characteristic measurement setup



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D. Reliability test items

Test Item	Test Condition	Judgement	Remark
High temperature storage	60°C, 240Hrs	Note 1	Note 2
Low temperature storage	-25°C, 240Hrs	Note 1	Note 2
High temperature & high humidity operation	40°C, 90%RH,240Hrs (No condensation)	Note 1	Note 2
High temperature operation	50°C, 240Hrs	Note 1	Note 2
Low temperature operation	0°C, 240Hrs	Note 1	Note 2
Thermal Shock (non-operation)	-20°C~60°C 1Hr, 10mins, 1Hr, 100cycles	Note 1	Note 2
Electrostatic discharge (ESD) (non-operation)	Contact: +/-8kV, 150pF(330ohms), 10 times/1 point, 1 time/1 sec Air discharge: +/-15kV, 150pF(330ohms), 10 times/1 point, 1 time/1 sec	No te 1	Note 2
Vibration (non-operation)	Vibration level : 1G Bandwidth : 10-500Hz Waveform : sine wave, sweep rate : 30min 1H for each direction X, Y, Z (3Hrs in total)	Note 1	Note 2
Mechanical shock (non-operation)	Shock level : 50G/11ms, Waveform : Half sine wave Direction: ±X, ±Y, ±Z once for each direction	Note 1	Note 2
MTBF Demonstration	50,000 hours with confidence level 90%	Note 1	Note 3

Note 1 :

Pass: Normal display image with no obvious non-uniformity and no line defect. Partial transformation of the module parts should be ignored.

Fail: No display image, obvious non-uniformity, or line defects.

Note 2 :

Evaluation should be tested after storage at room temperature for one hour.

Note 3 :

The MTBF (Exclude CCFL) calculation is based on the assumption that the failure rate distribution meets the Exponential Model.

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E. Safety

(1) Sharp Edge Requirements

There will be no sharp edges or corners on the display assembly that could cause injury.

(2) Materials

a. Toxicity

There will be no carcinogenic materials used anywhere in the display module. If toxic materials are used, they will be reviewed and approved by the responsible InnoLux Toxicologist.

b. Flammability

All components including electrical components that do not meet the flammability grade UL94-V1 in the module will complete the flammability rating exception approval process. The printed circuit board will be made from material rated 94-V1 or better. The actual UL flammability rating will be printed on the printed circuit board.

C. Capacitors

If any polarized capacitors are used in the display assembly, provisions will be made to keep them from being inserted backwards.

F. Display quality

The display quality of the color TFT-LCD module should be in compliance with the Innolux's Incoming inspection standard.

G. Handling precaution

The Handling of the TFT-LCD should be in compliance with the Innolux's handling principle standard.

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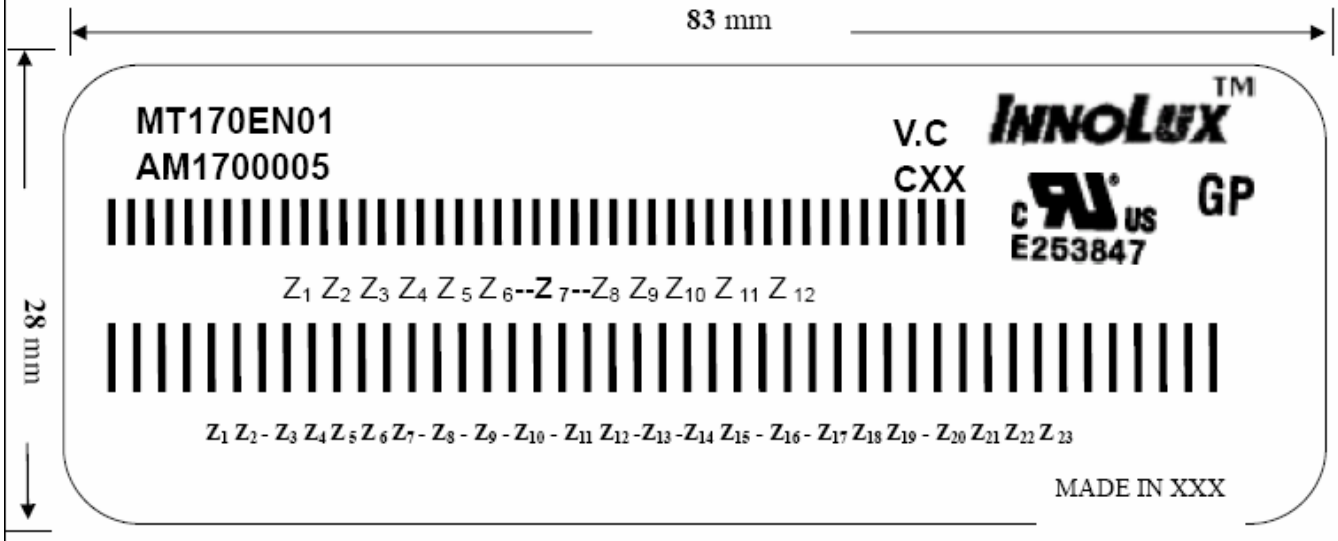
H. Label

(1) Module Label



(a) Model Number : MT170EN01

(b) Version : V.C

(c) Serial ID I : Z_1 Z_2 Z_3 Z_4 Z_5 Z_6 Z_7 Z_8 Z_9 Z_{10} Z_{11} Z_{12}

- Z_8 Z_9 Z_{10} Z_{11} Z_{12} : Serial No
- Z_7 : Code of grade
- Z_6 : INL internal use
- Z_5 : INL internal use
- Z_3 Z_4 : Year, Month, Date
- Z_1 Z_2 : INL internal use

Serial ID includes the information as below :

1. Manufactured Date: Year: 0~9, for 2000~2009.
2. Month: 1~9 & A~C for Jan.~Dec.
3. Date: 1~9 & A~Z (exclude I, O, Q, U) for 1th~31th.
4. Code of grade: 1, 2,3, 5, 7, E
5. Serial No: Module manufacture sequential number.

(e) Serial ID II (INL internal use)

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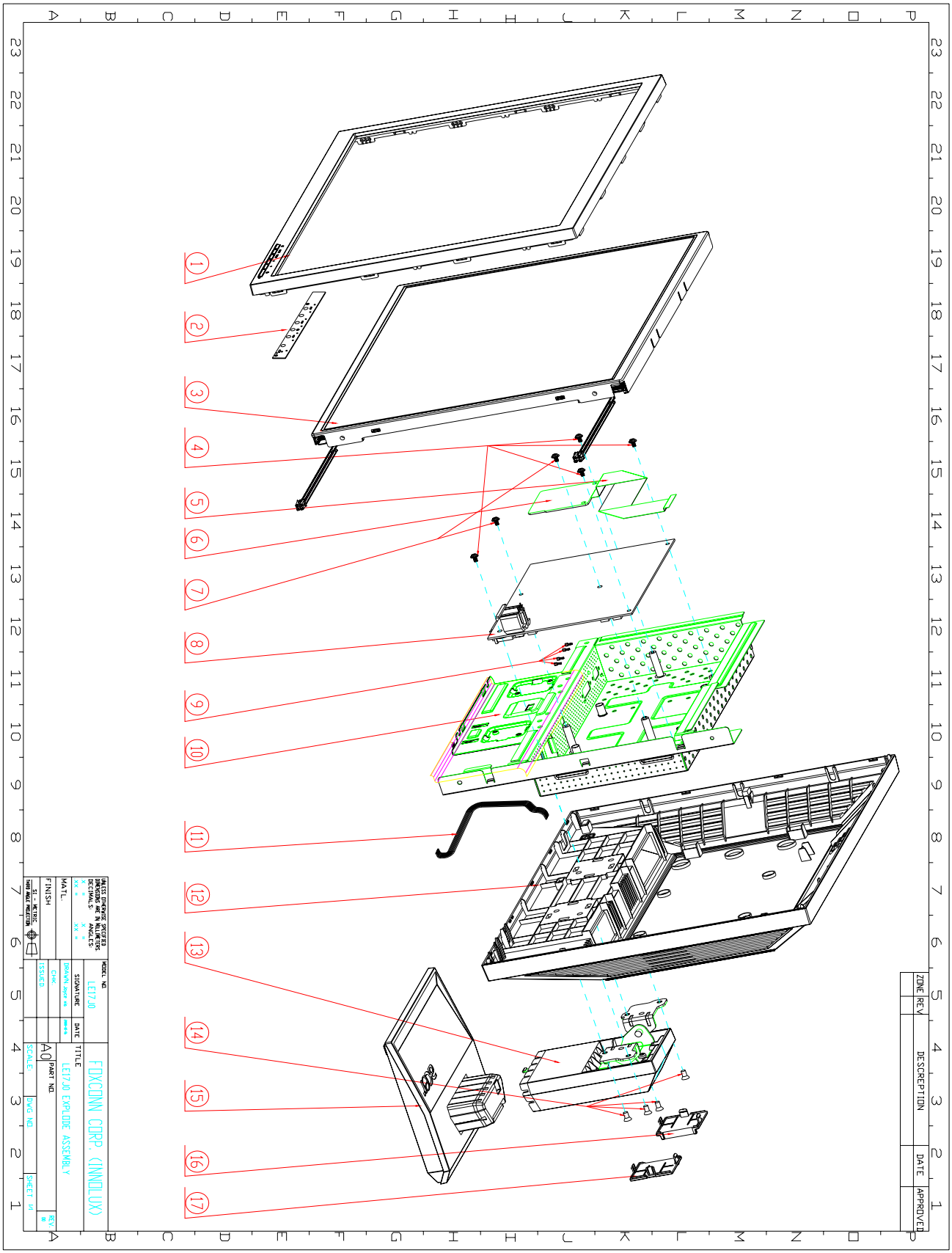
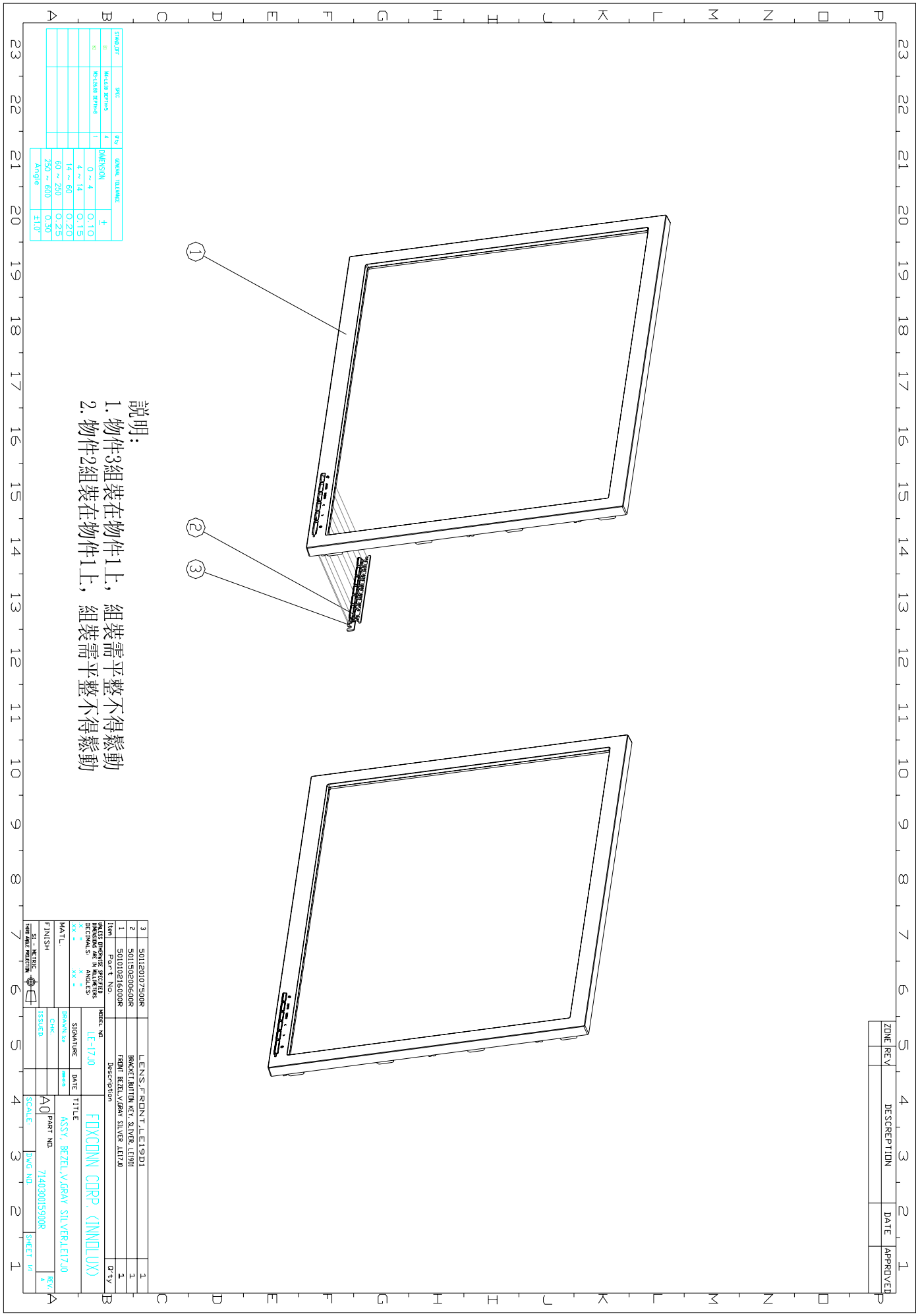
03 Exploded Diagram

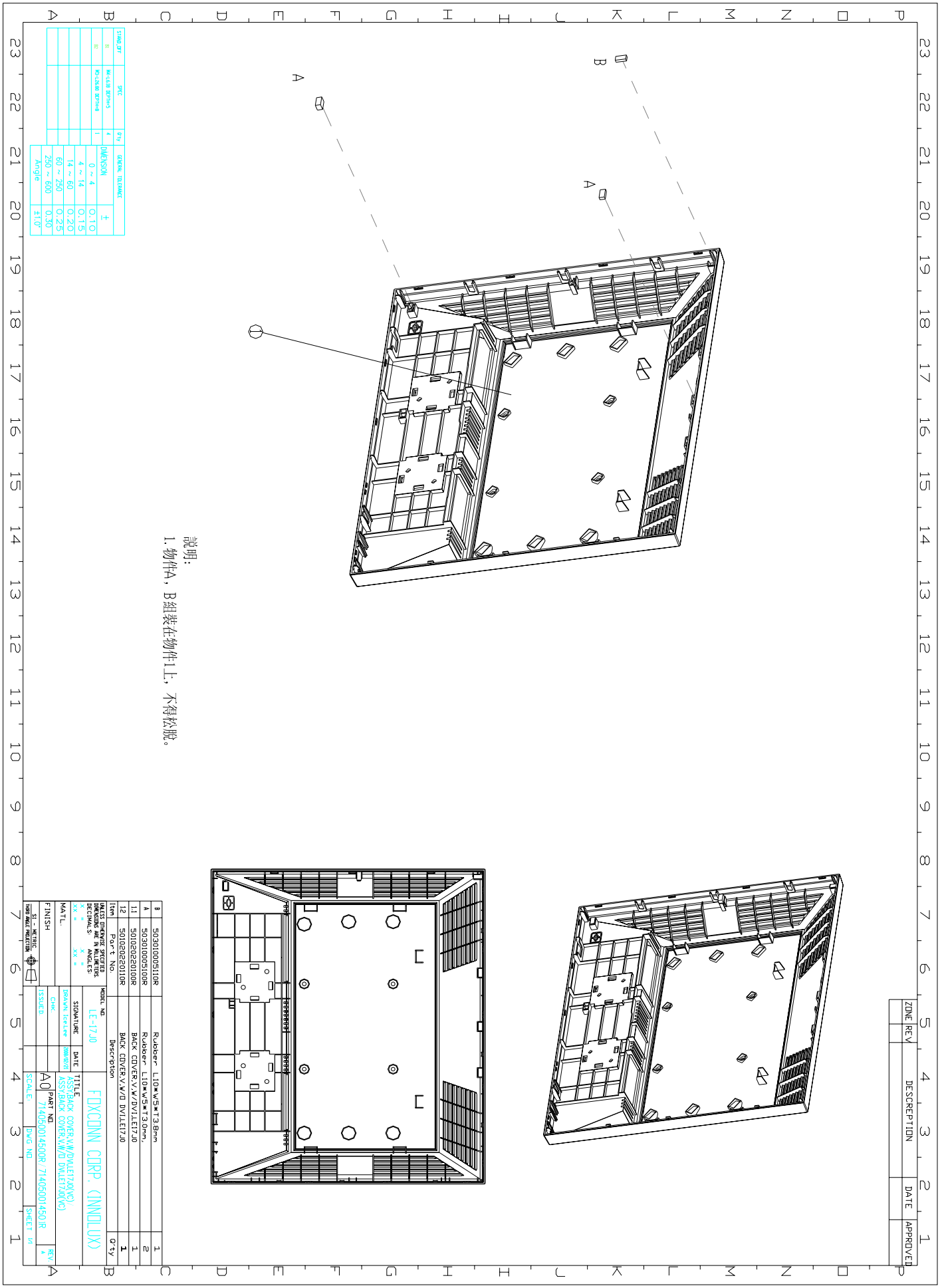
3.1. LCD Exploded drawing (All)



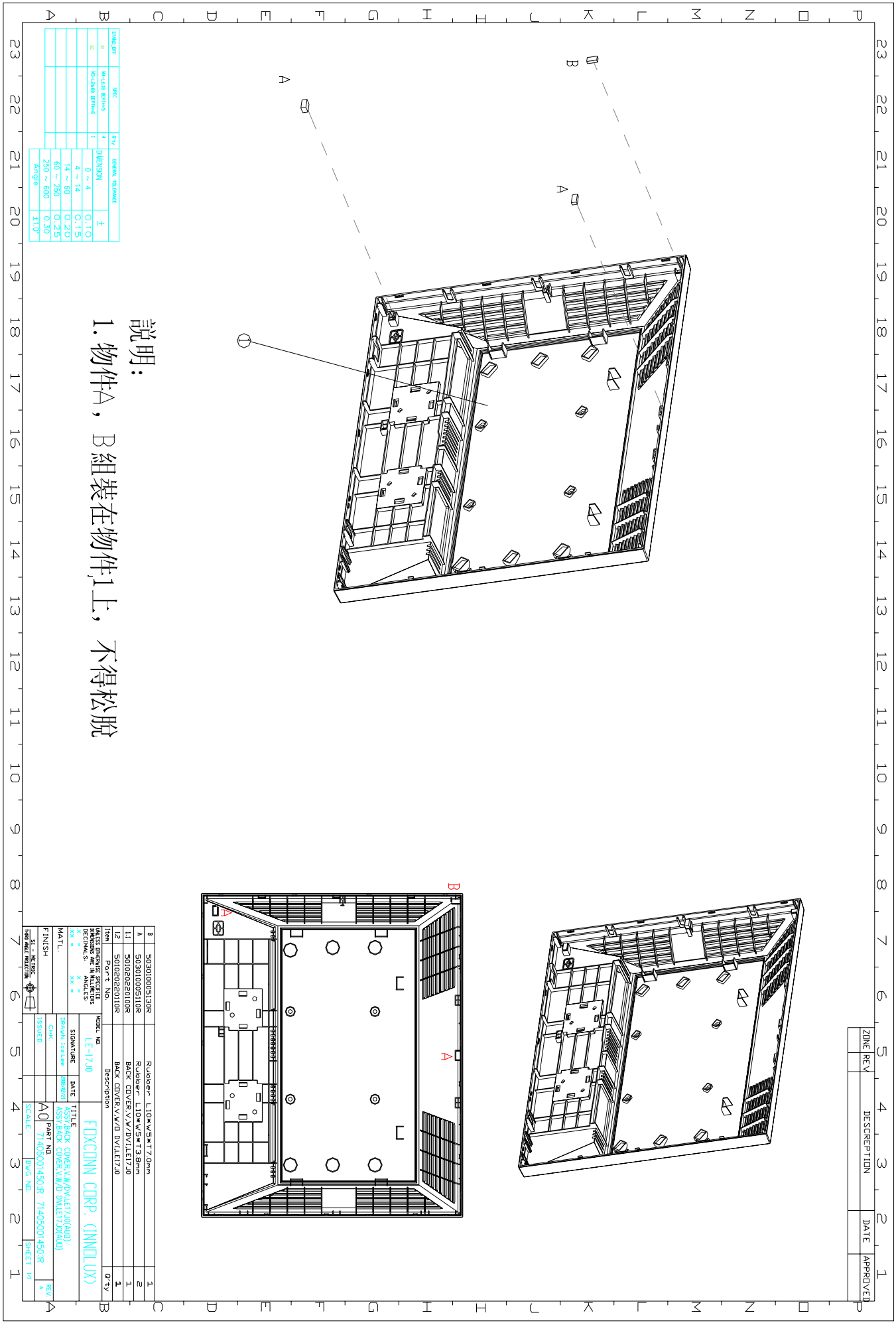
3.2 Assy Bezel Exploded drawing



3.3Assy BACK COVER Exploded drawing For VC panel



3.4 Assy BACK COVER Exploded drawing for AUO panel

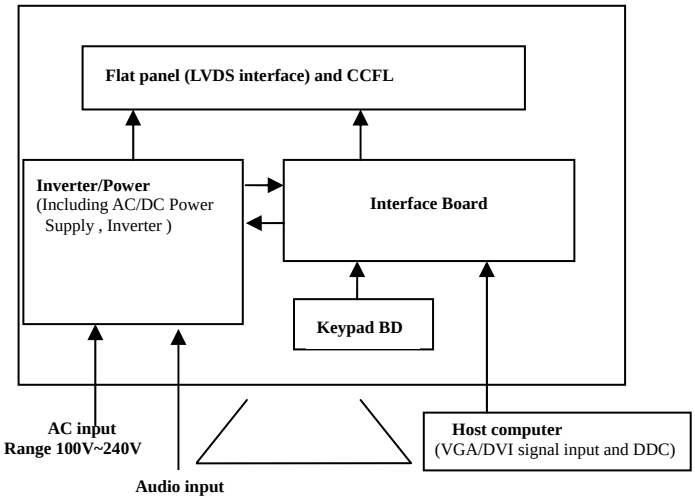


04 Troubleshooting

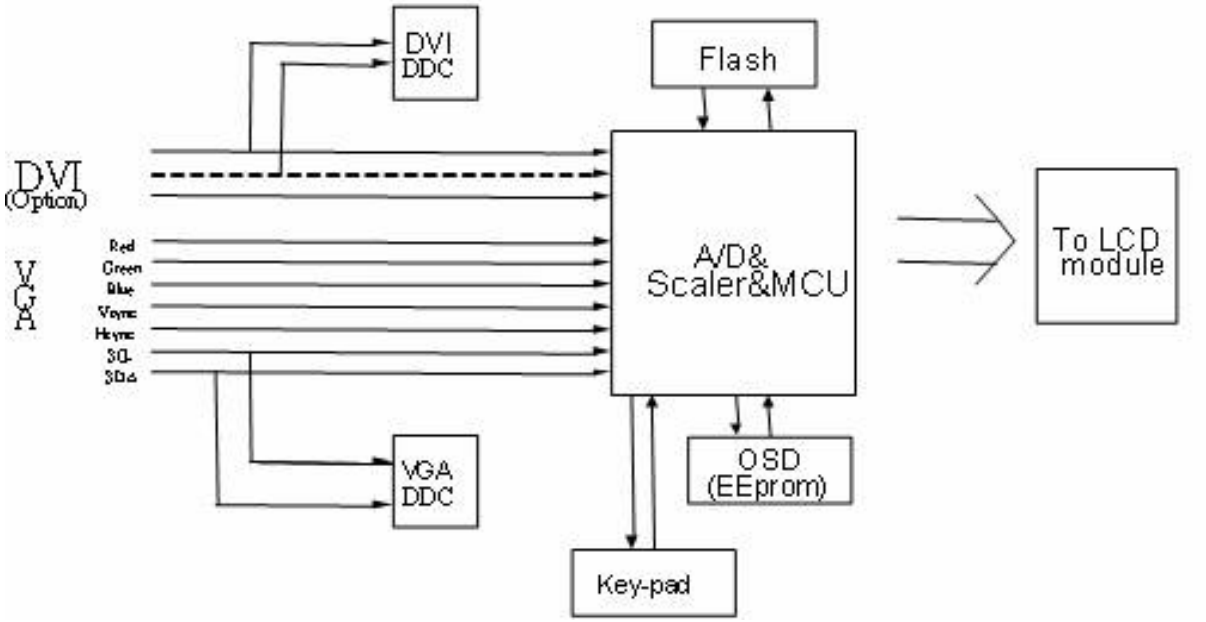
1. Common Acknowledge

1.1 Monitor Block Diagram

The LCD Monitor contains an interface board, and inverter/power keypad board and flat panel. In Inverter/power/Audio board, power section supplies +14V & +5V for Inverter and Interface board used. The inverter section drives the backlight of panel and the DC-DC conversion.



- 2 Interface BOARD DIAGRAM



1.3 Electronic Circuit Theory

1.3.1 Switching Mode Power Supply

1.3.1.1 AC Current Input Circuit

P801 is a connector for connecting AC Power. F801 is a fuse to protect all the circuit. AC input voltage is from 90v to 264V. R801 and R802 joined between two inputting main circuit to prevent man from shock. L801 is used to clear up low frequency wave. C801 and C802 are used to discharge the waves that L801 produced. High frequency waves are damped by C801 and C802. D801 is a rectifier

which composed of 4 build-in diodes, it inverts AC to DC.

1.3.1.2 High Voltage to Low Voltage Control Circuit

C804 is used to smooth the wave from rectifier. IC802 is a highly integrated PWM controller. When rectified DC high voltage is applied to the Vcc pin during start-up, the MOSFET Q804 is initially off, and the Vcc pin capacitor is charged. When the Vcc pin voltage reaches approximately 10V, the control circuitry is activated and the soft-start begins. The soft-start circuit gradually increases the duty cycle of the MOSFET from zero to the maximum value over approximately 4ms. If no external feedback/supply current is fed into the CS pin by the end of the soft-start, the current Setpoint will be above the fault level, FAULT flag is raised, if the FAULT duration exceeds 80ms, the output controller disable

Resistor R808, R809, R810, R811 are for line over voltage shutdown(OVP)

When PWM is turned off, the main current flow will be consumed through R804 and D802, This will prevent MOSFET Q804 from being damaged under large current impulse and voltage spike.

D804 and C807 to provide internal Auxiliary voltage to Vcc pin during normal operation. Otherwise, error amplifier and feedback current input the CS pin for duty cycle control.

1.3.1.3 DC_5V and DC_14V Output Circuit

For DC 5V, D805 is used to rectify the inducted current. R828 and C814 are used to store energy when current is reversed. The parts including C818, C822, C820,L803 are used to smooth the current waves.

For DC 14V, D803 is used to rectify the inducted current. R827 and C813 are used to store energy when current is reversed. The parts including C815, C817 and L802 are used to smooth the current waves.

1.3.1.4 Feedback and OVP Protect Circuit

Pin R of IC803 is supplied 2.5-v stable voltage. It connects to 5V and 14V output through R822, R823 and R824. R822, R823 and R824 are output sampling resistor. When the sampling voltage more than 2.5V or less than 2.5V, current of FB IC802 will change, this can change the voltage from T801.

OVP Protect Circuit: When output is overvoltage, the auxiliary winding voltage will be increased, when it reaches about 14V. Q803 is triggered . It makes the IC802 Pin 1 exceed 5V, then the IC802 output will be disabled.

Q801, R816, R817 and ZD803 make up of dummy loading circuit. For start-up sequence, during 5V output take place high loading first, this dummy loading circuit operated to insure 14V not be increased.

◆ I/F Board Circuit

1.3.2.1 RGB CAPTURE

- Signal RED,GREEN,BLUE input through CN103 #1,#2,#3, Stop DC via C123, C124 and C125, and then enter into U104 (scaler) analog input terminal #16,#14,#12, and then scaler deals with signal internally. EP102, EP103 EP104 are ESD protector to prevent U104 from ESD.
- Signal DDC_SCL (series clock) inputs via CN103#15, and then passes through EP109 for ESD protection, goes into U102 (MCU) #5.
- Signal DDC_SDA (series data) inputs via CN103#12, and then passes through EP108 for ESD protection, goes into U102 (MCU) #8.
- Signal TTL vertical sync. (Vsync) inputs via CN103 #14, and then clamped by EP107, passes through R162, and then goes into IC U104 (scaler) #8.
- Signal TTL horizontal sync. (Hsync) inputs via CN103 #13, and then clamped by EP106, passes through FB104, R163, and then goes into IC U104 (scaler) #9.
- CN103#5 is defined as cable detect pin, this detector realize passes through D101, D102, Q105 or through D101, D102, Q105, R107,Q106 change to MCU_VCC.
- U103 power is supplied by MCU_VCC.
- U103 is an EEPROM IC which is memory and EDID data saved in it.

1.3.2.2 Buttons Control

- Button “Power” on right side bezel connects to U102 (MCU) #9 through R134, via CN901#1.
- Button “E-Color” “AUTO”“MENU” “UP” “DOWN “on right side bezel connects to U102 (MCU)

#14,#22,#10,#21 through R141,R138,R135,R140,via CN901 #5, #6, #8, #7.

- LED Indicator on Front Bezel

1When press button “power”, U102 (MCU) #1 sends out a low potential, via R130, flow to CN901 #2 on keypad, LED Blue ON.

2When in “Suspend” mode, U102 (MCU) #48 sends out a low potential, via R129, flows to CN901 #4 on keypad, LED Amber ON.

1.3.2.3 Realtk CHIP U104 (scaler)&U102 (MCU)

- U104 (RTD2025L) #21~#28 output 8 bit even LVDS digital data to panel control circuit through CN104.
- U104 (RTD2025L) #29~#36 output 8 bit odd LVDS digital data to panel control circuit through CN104.
- U102 (RTD2120) #44 outputs Brightness “PWM” signals to control CCFL brightness.
- U102 (RTD2120) #39 output PPWR ”H” potential to make Q104 conducted, and then make Q101 conducted, +5V flow to CN104#1~#3 as Panel VDD .
- U102 (RTD2120) #46 output CCFL_ON/OFF ”H” potential to control Inverter on/off.
- TCLK by Crystal 24.000MHz input to U102 (RTD2120) #15, #16.

Please refer to RTD2120&RTD2025L Pin Assignments table in page.

1.3.2.4 Regulator Circuit

- +5V is from switching mode power supply for Panel used.
- +3.3V generates from +5V through C101 and C102 filtering and U101 which is output +3.3V LDO to generate MCU_VCC for U102, U103 and TMDS_VDD for U104.
- +1.8V generates from +3.3V through Q110 and C134, C133, C135, C136, C137 for U104 used.

Inverter circuit

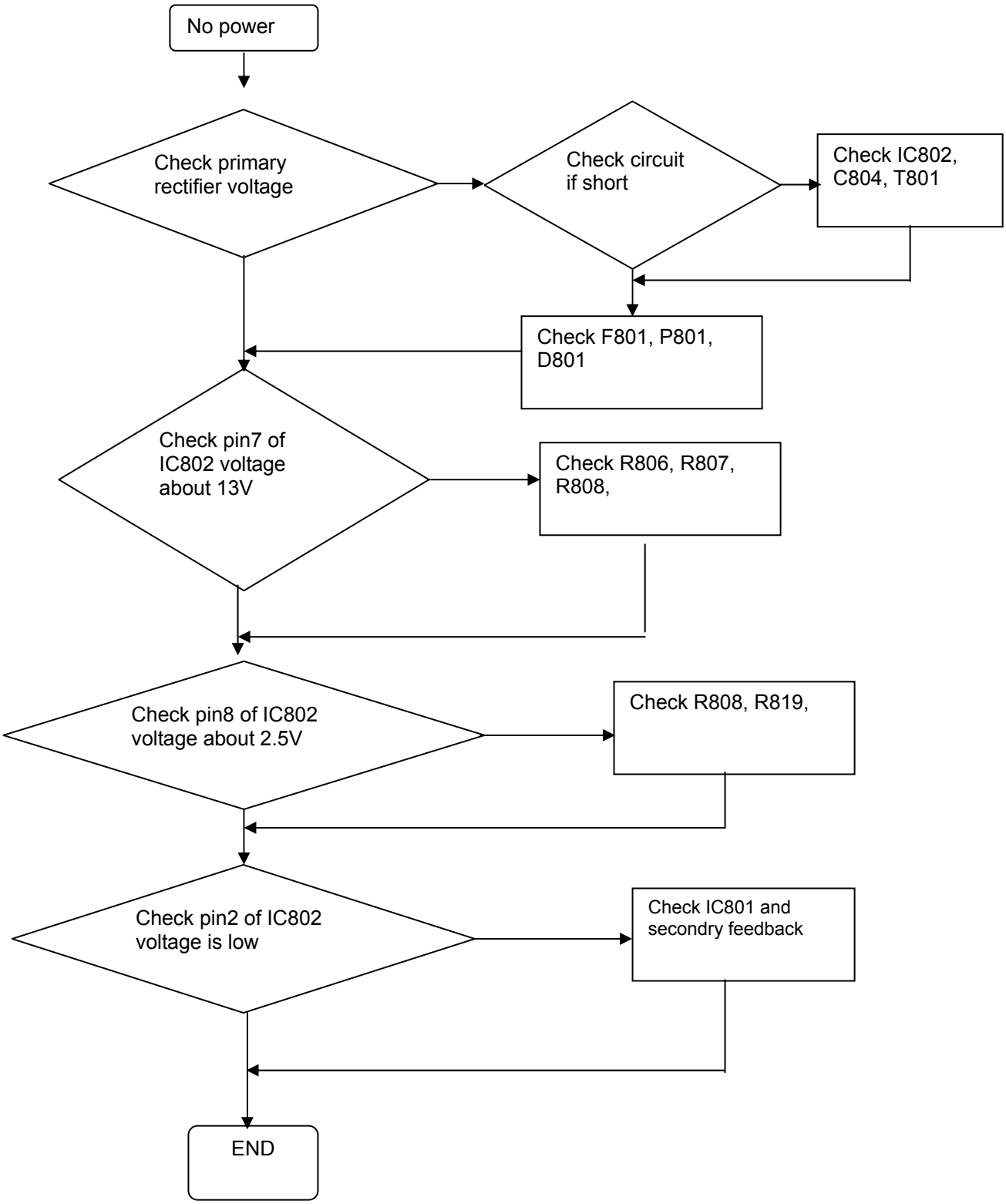
14VDC provides the power for IC501; the control signals Brightness and ON/OFF come from I/F board. ON/OFF signal connect to pin8 of IC501 and makes IC501 enable. Brightness signal connect to pin7 of IC501 and regulates the panel brightness, R510 , R511, C507 make up a network of delaying time circuit . The striking frequency is determined by the external Resistor R505 pin5 of IC505and r516. The operation frequency is determined by the external Resistor R505 pin5 of IC505. the capacitor and resistrer connected to pin4 to set striking time and shunt down delay time. BURST MODE dimming pulse frequency and duty is regulated by I/F board.

The output drives, include square pulses output of pin14,12,11 to drive MOSFET U501, U502, and U501, U502 are N channel MOSFETs. U501 and U502 work as harf-bridge topology.Two transformers are connected in parallel with each transformer driving two lamps in series. Turning each N-Channel MOSFET “on/off” complementarily, produces an alternating current through the transformer primary and secondary. The “on” duration of the switches determines the amount of energy delivered to the CCFLs.

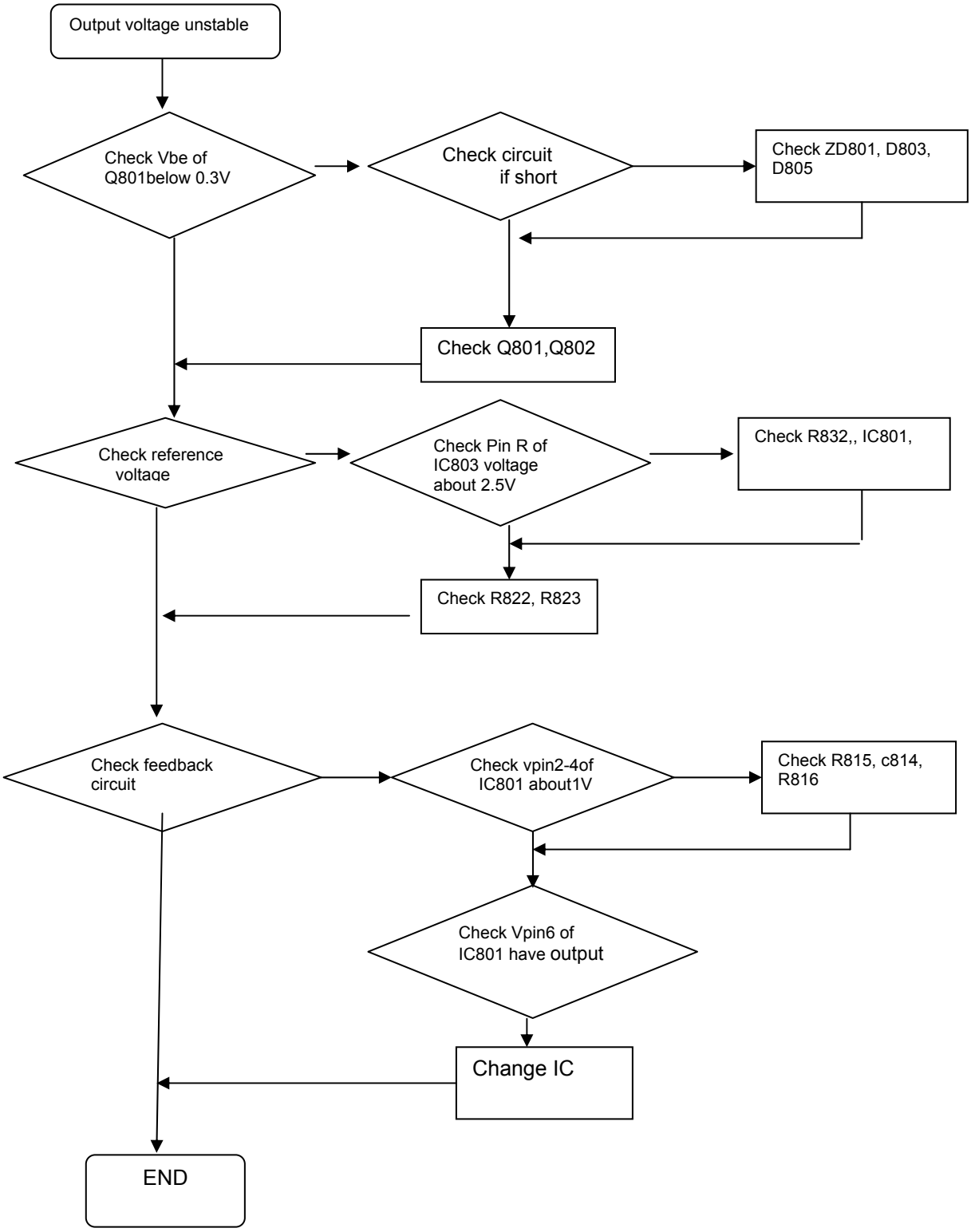
The current flowing through CCFL is sensed and regulated through sense resistor R502, R543. The feedback voltage connected to Pin2 (ISEN), then compared with a interal reference voltage ,resulting in PWM signal outputs to adjust output voltage.

Over Voltage Protection and over-current protection are monitored by the voltage on OV(Pin 1) and LI (Pin2) During normal operation , if a CCFL is damaged or removed ,the voltage at OV (Pin6) increases .Once the voltage at OV Pin exceeds 1.2V (OVPT Setting) the driver output duty cycle is regulated and the shutdown delay timer is activated. Once over the delay time the IC will shut down

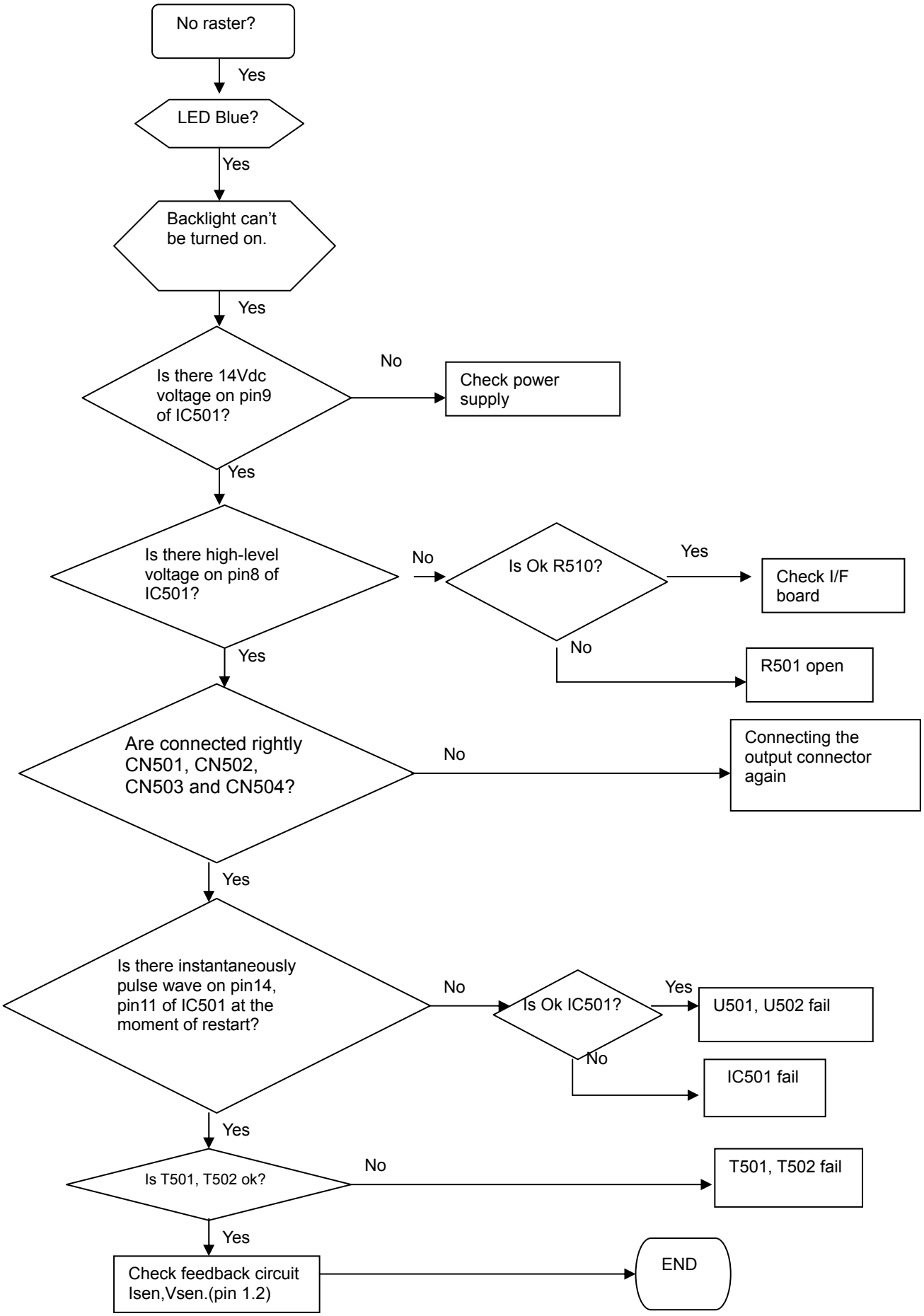
1. No Power & Power LED Off


No power
Check primary rectifier voltage
Check circuit if short
Check IC802, C804, T801
Check F801, P801, D801
Check pin7 of IC802 voltage about 13V
Check R806, R807, R808,
Check pin8 of IC802 voltage about 2.5V
Check R808, R819,
Check pin2 of IC802 voltage is low
Check IC801 and secondry feedback
END

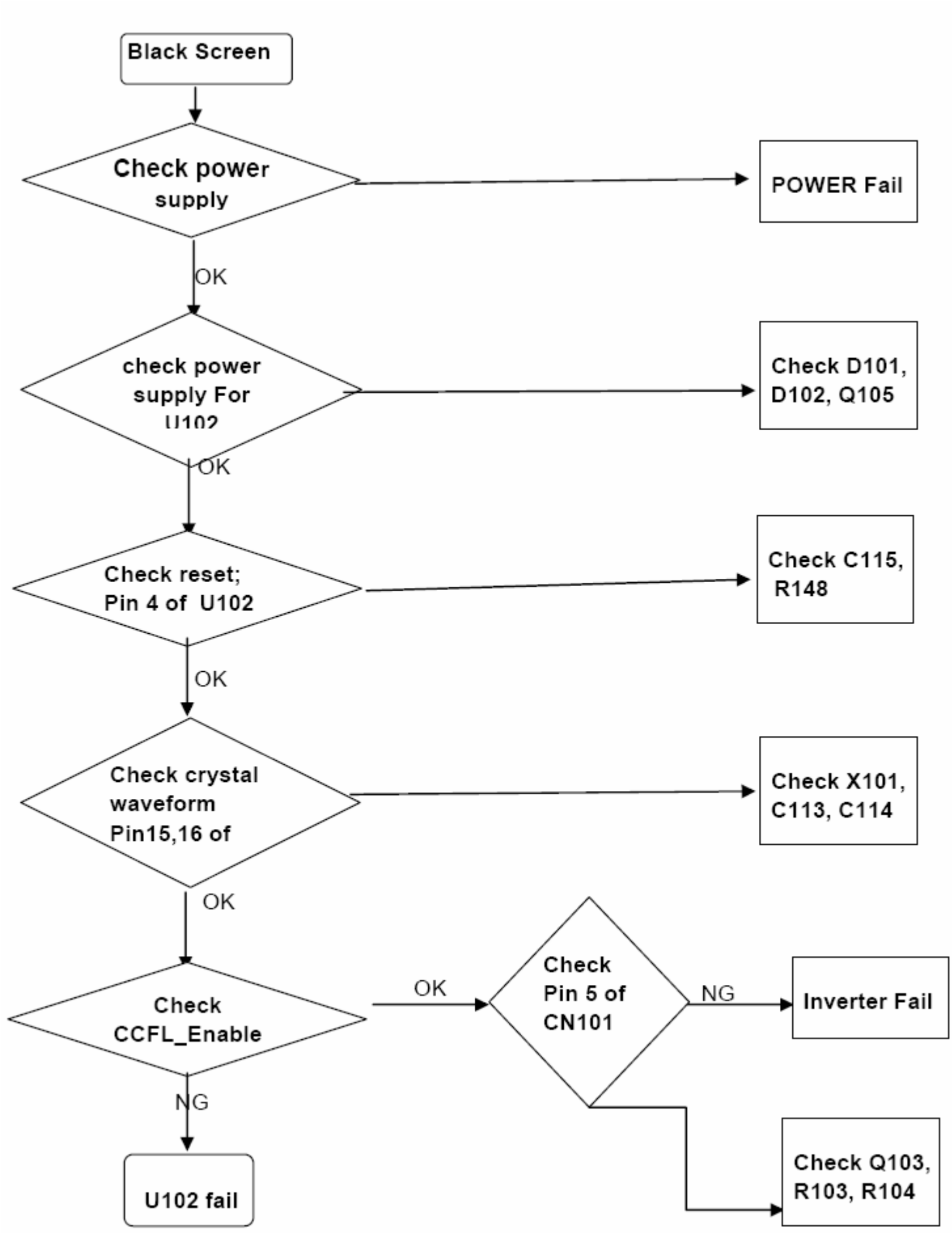
2. DC output voltage is unstable



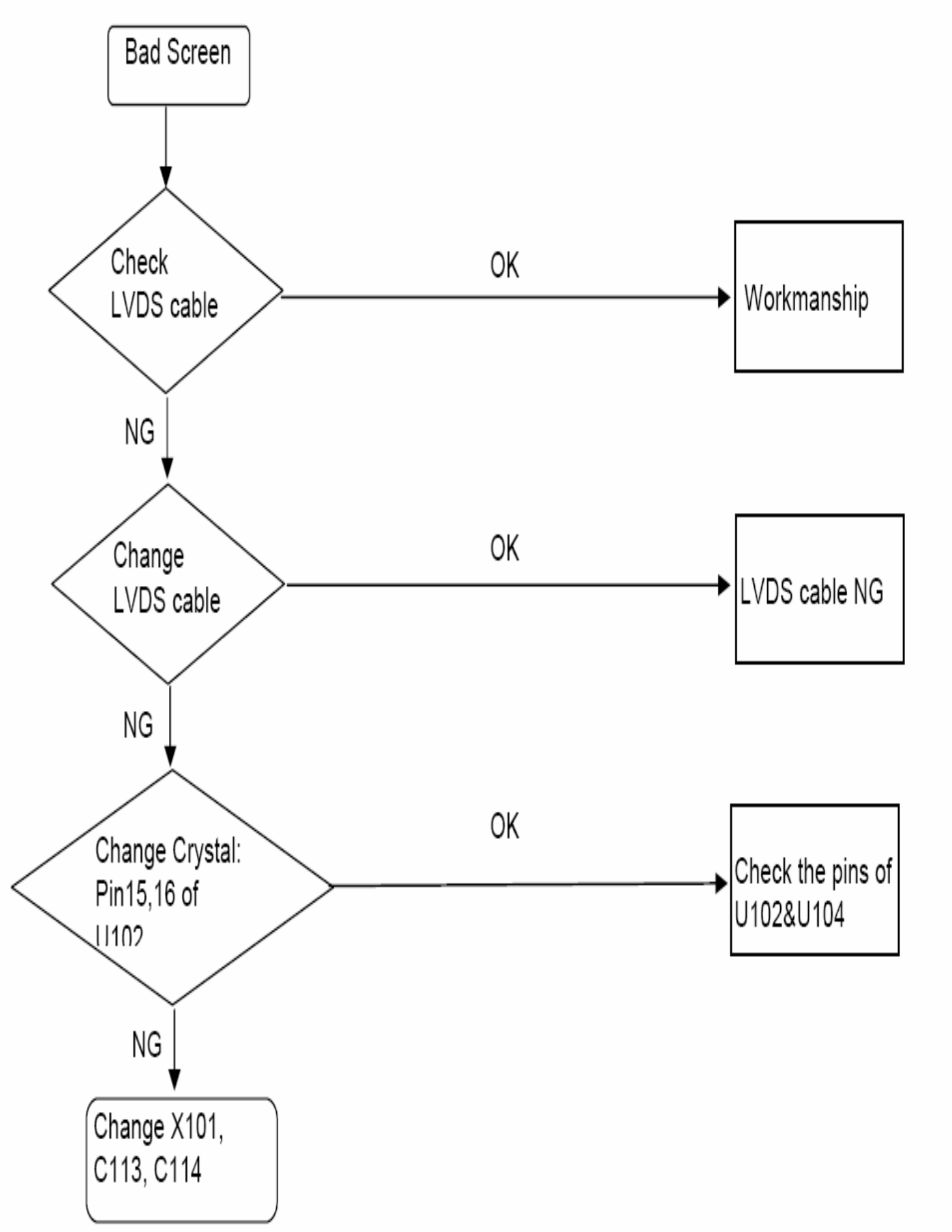
4. **No Raster**


No raster?
Yes
LED Blue?
Yes
Backlight can't be turned on.
Yes
Is there 14Vdc voltage on pin9 of IC501?
No
Check power supply
Yes
Is there high-level voltage on pin8 of IC501?
No
Is Ok R510?
Yes
Check I/F board
No
R501 open
Yes
Are connected rightly CN501, CN502, CN503 and CN504?
No
Connecting the output connector again
Yes
Is there instantaneously pulse wave on pin14, pin11 of IC501 at the moment of restart?
No
Is Ok IC501?
Yes
U501, U502 fail
No
IC501 fail
Yes
Is T501, T502 ok?
No
T501, T502 fail
Yes
Check feedback circuit Isen,Vsen.(pin 1.2)
END

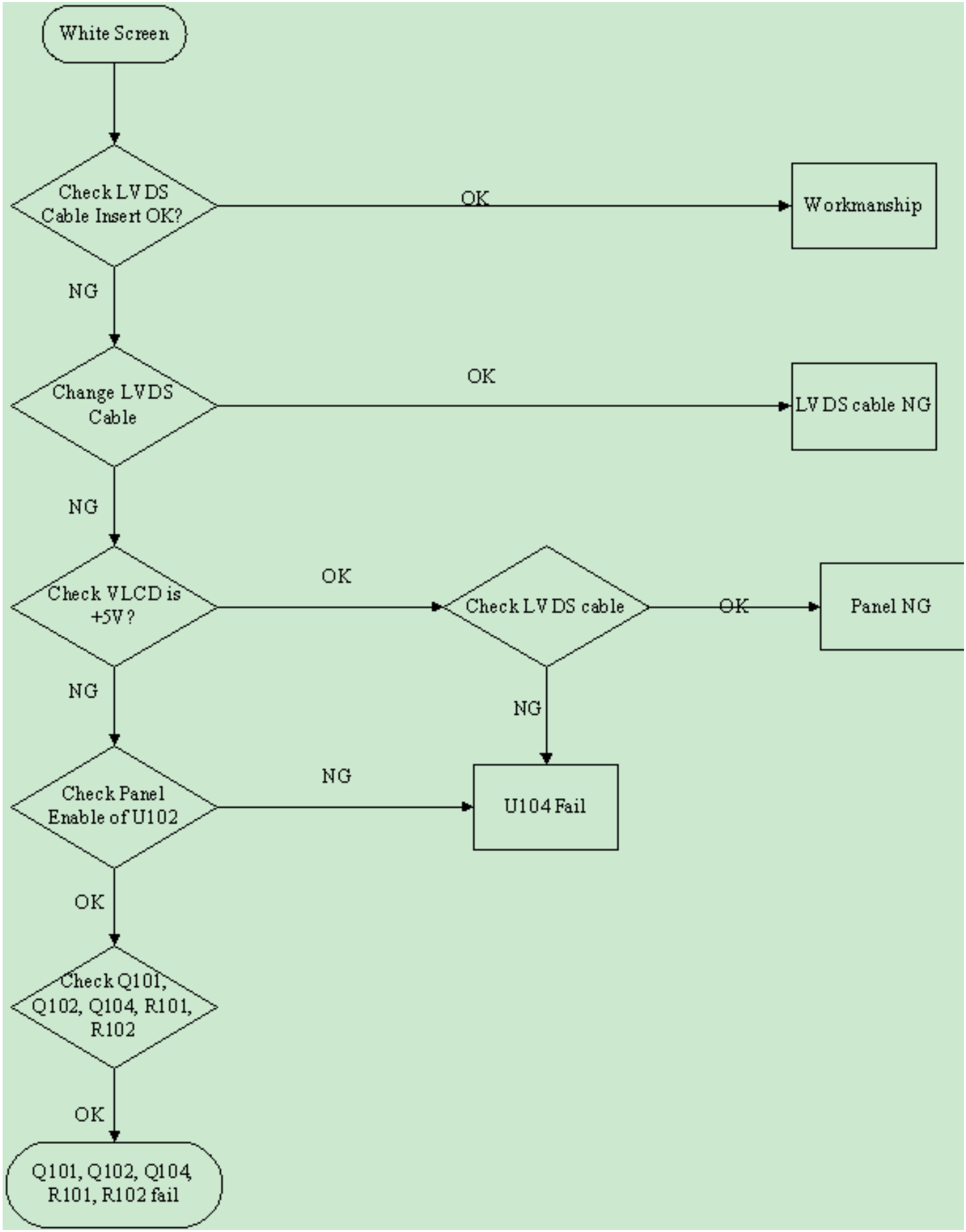
5. Black Screen



6. Bad Screen


Bad Screen
Check LVDS cable
OK
Workmanship
NG
Change LVDS cable
OK
LVDS cable NG
NG
Change Crystal: Pin15,16 of U102
OK
Check the pins of U102&U104
NG
Change X101, C113, C114

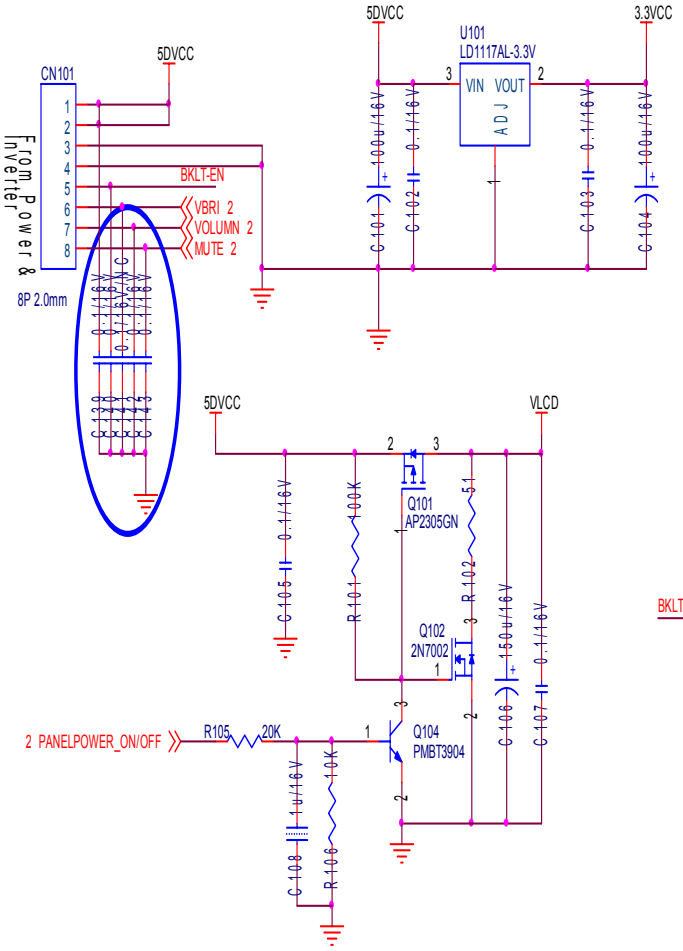
7. White Screen



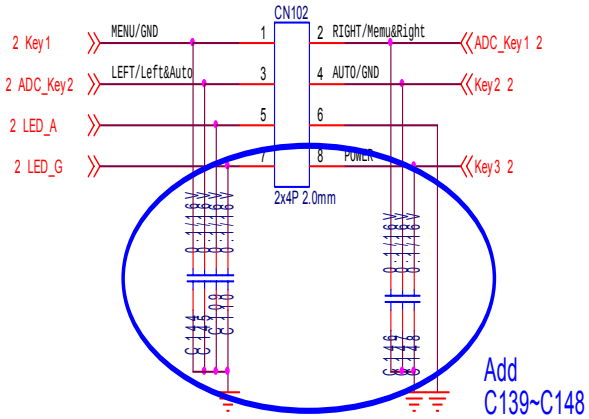
05 Spare parts List

			8171J061A020R	8171J071A020R
OEM PART NO	**DESCRIPTION**	**MOQ**	**N/A**	**N/A**
791421300600R	PCBA,I/F BOARD(VC,EMEA),LE17J0-610 ROHS	50	1	0
791401500000R	PCBA,KEYPAD BOARD,LE9D0-612 ROHS	50	1	1
791421400600R	PCBA,P/I BOARD,W/O SPK,LE17J0-622 ROHS	50	1	1
791421300700R	PCBA,I/F BOARD(EMEA,W/O),LE17J0-710 ROHS	50	0	1
430300801670R	HRN ASSY 2x4P 55mm UL1571#28,ROHS	50	1	1
430300801760R	HRN ASSY 2x4P to 8P 160mm UL1571#28,ROHS	50	1	1
430303001520R	HRN LVDS FFC 30P 231mm W/MYLAR&Core ROHS	50	1	1
453070800210R	PWR CORD 16A/250V BLK 6FT VDE H05VV-F 3G	50	1	1
453010100380R	CABLE,D-SUB 15P MALE 6FT BLACK/BLUE, ROH	50	1	1
714030015900R	ASSY, BEZEL,V,GRAY SILVER,LE17J0	50	1	1
714011202300R	ASSY,STAND,BLACK,LE19D1	50	1	1
714020013200R	ASSY,BASE,BLACK,LE17J0	50	1	1
501020220110R	BACK COVER,V,W/O DVI,LE17J0	50	1	1
501240209800R	BASE,COVER,V,BLACK,LE17J0	50	1	1
501020220020R	COVER HINGE,BLACK RIGHT,LE19D1	50	1	1
501020220021R	COVER HINGE,BLACK LEFT,LE19D1	50	1	1
701000007201R	ASSY,CHASSIS,V,W/O DVI, LE17J0(VC)	50	1	0
701000007204R	ASSY,CHASSIS,V,W/O DVI, LE17J0(AUO-B)	50	0	1
631102072741R	LCP 17" MT170EN01-VC-G1,AM1700005C21(INN	10	1	0
631102072472R	LCP 17"M170EG01-VD-0B(AUO)ROHS	10	0	1

06 Schematics and Layouts



C141 Shoule be canceled for the brightness is not so good



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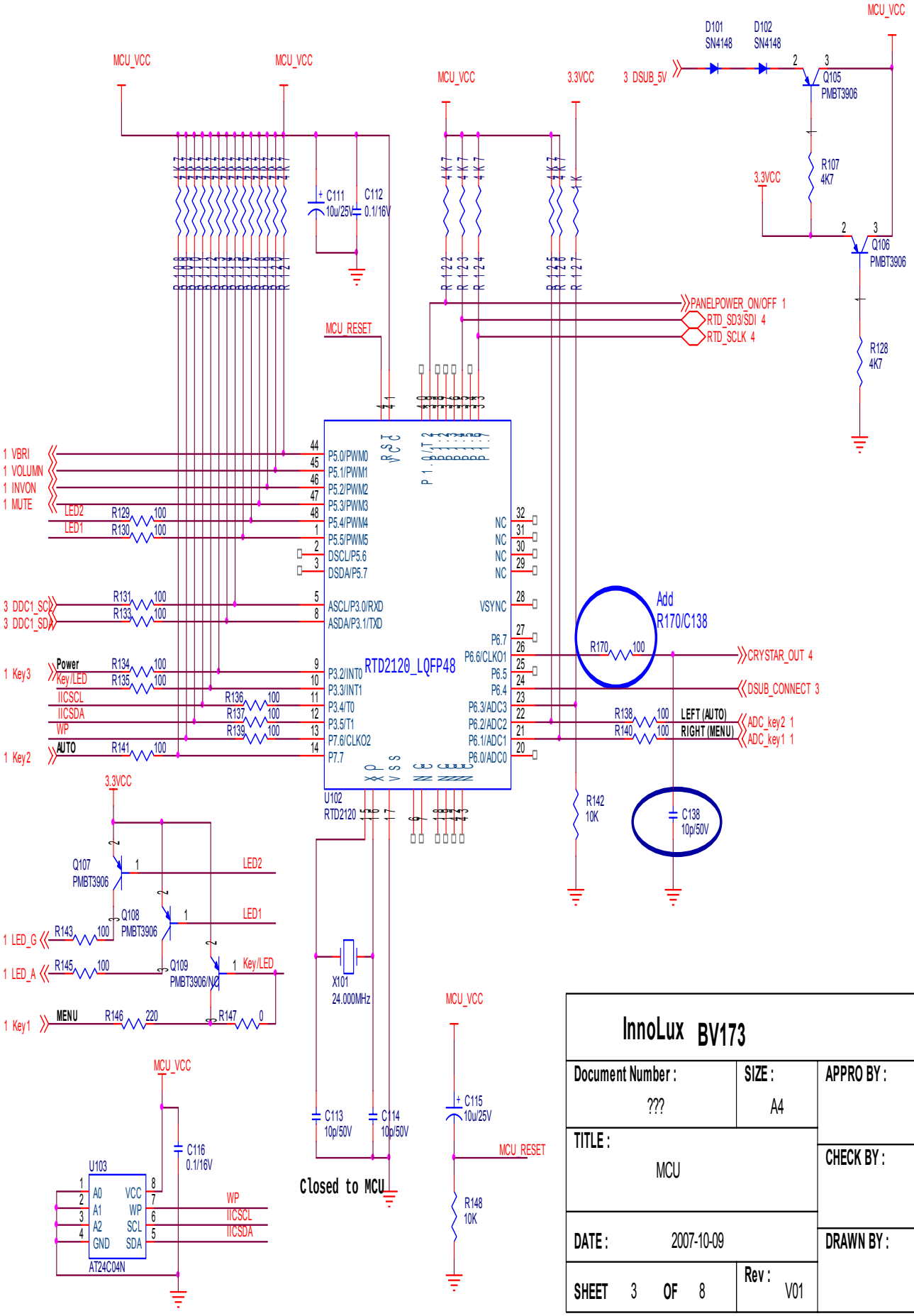

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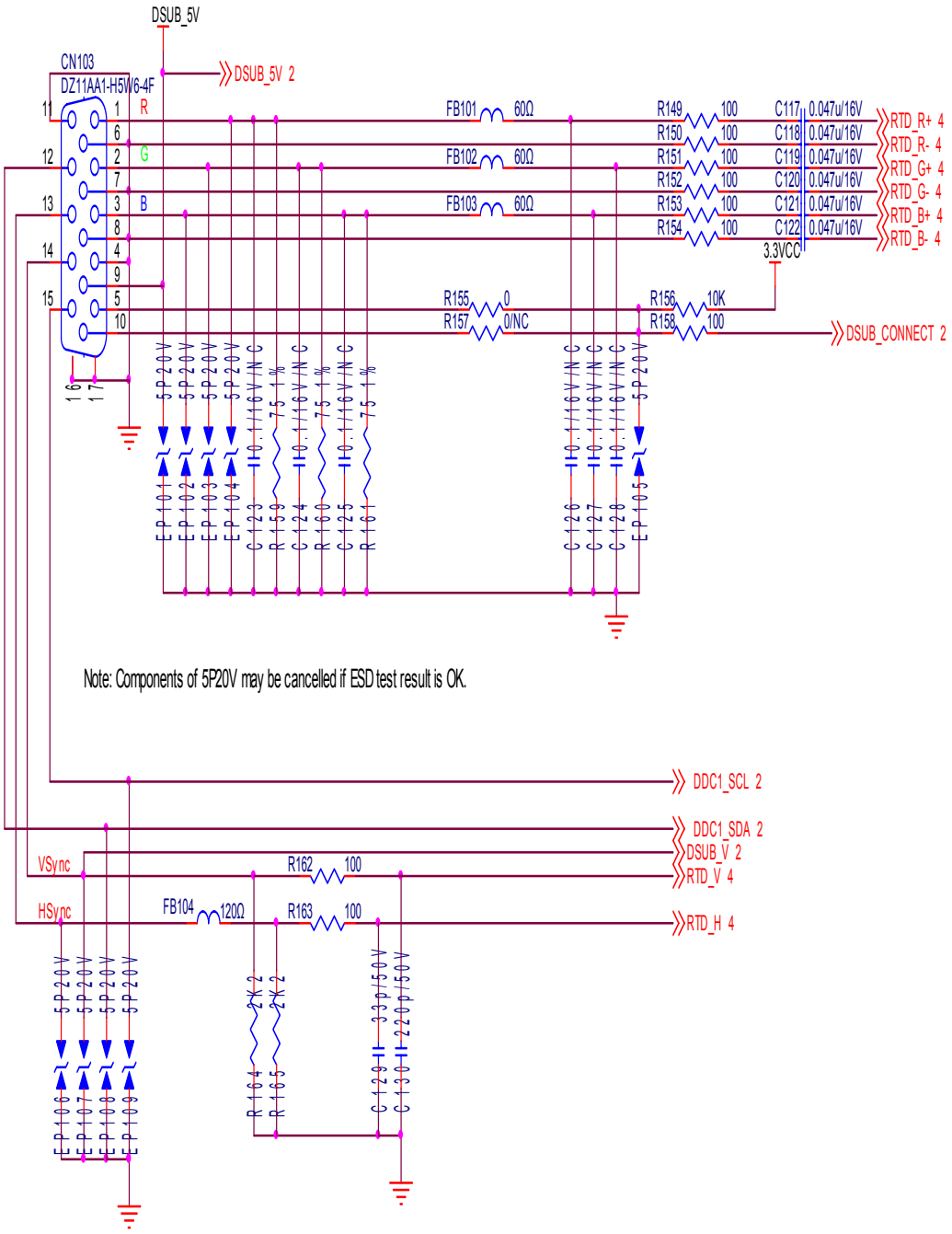
SHEET 3 OF 8	Rev : V01	



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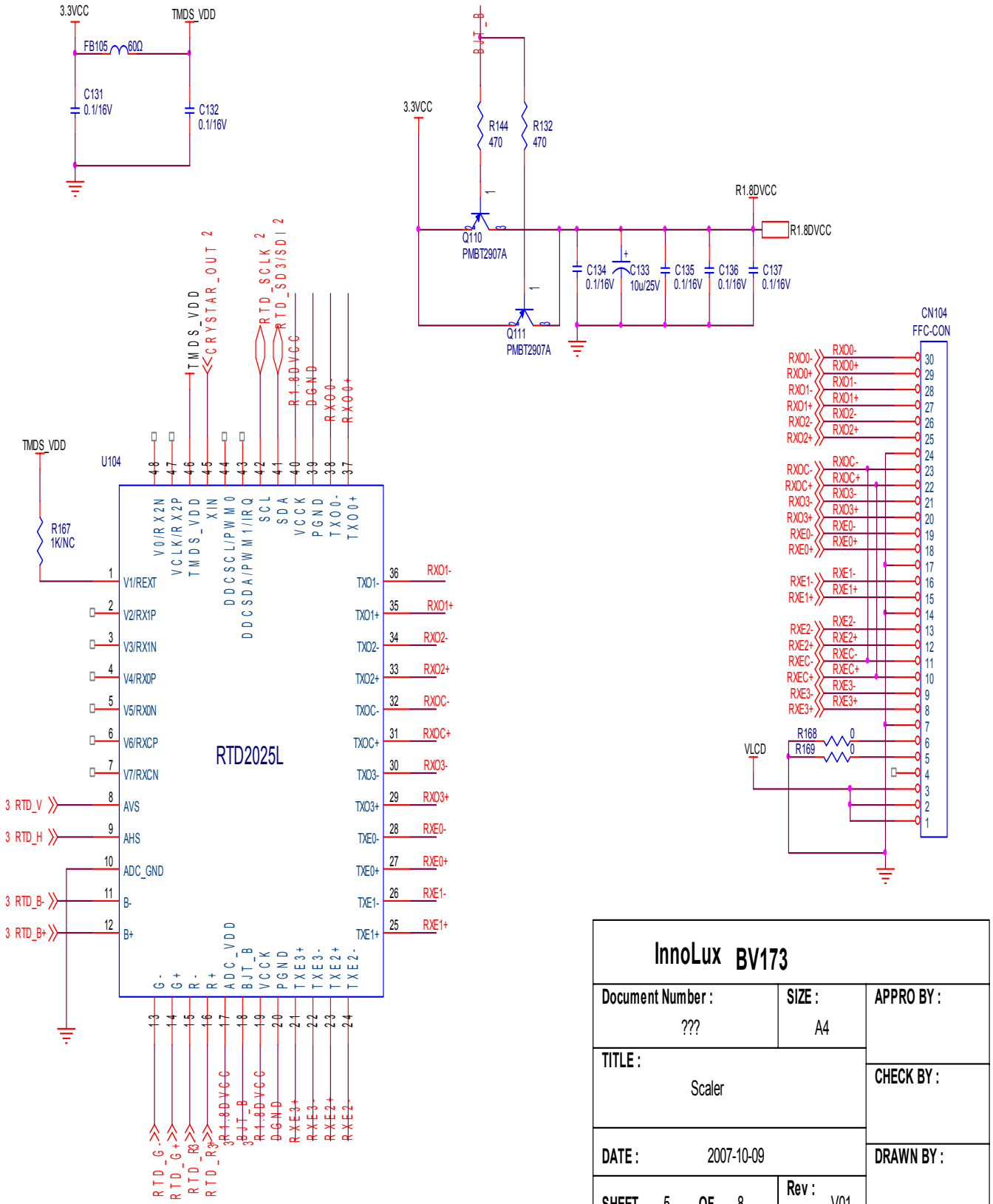
SHEET 4 OF 8	Rev : V01	



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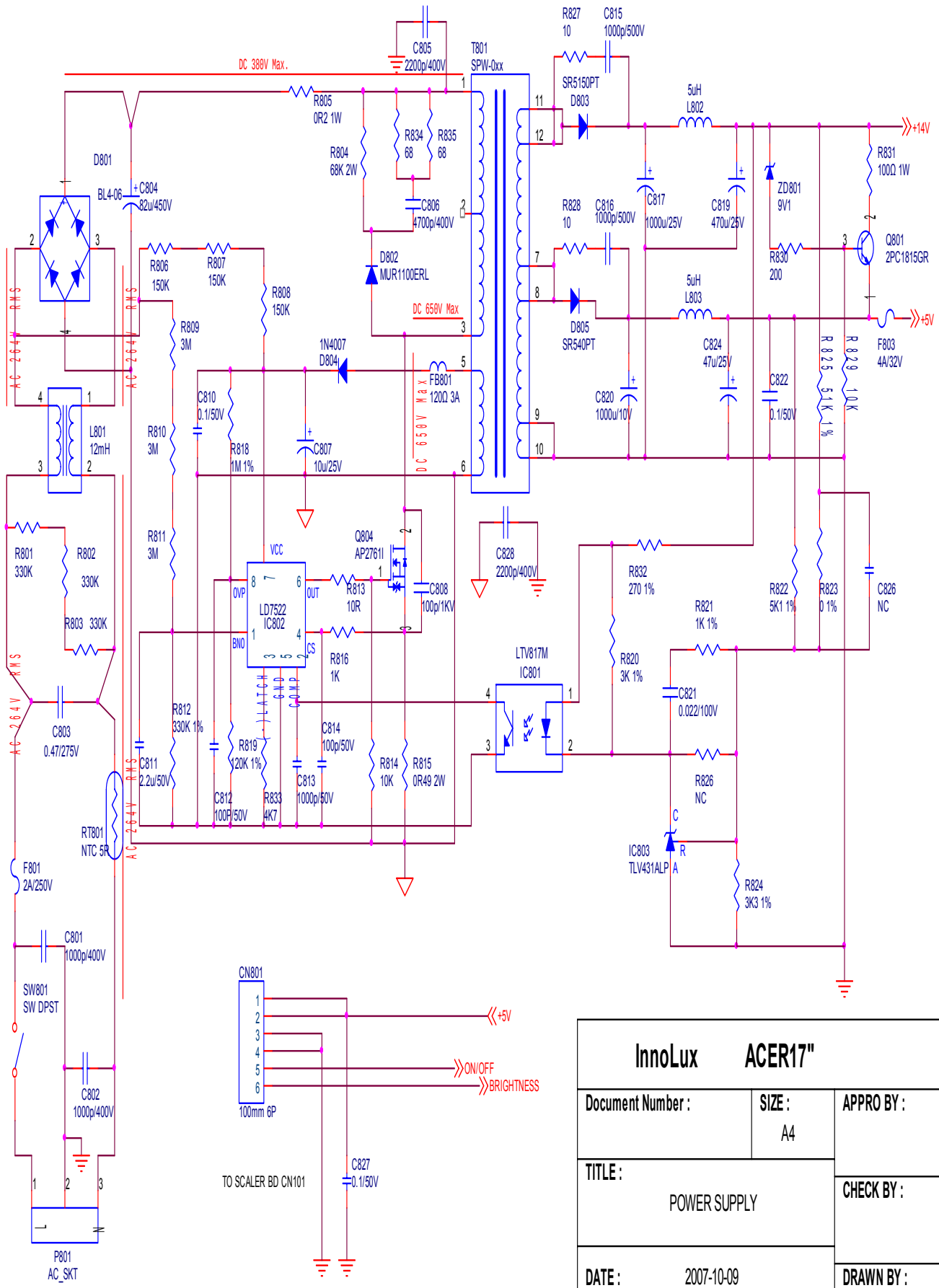
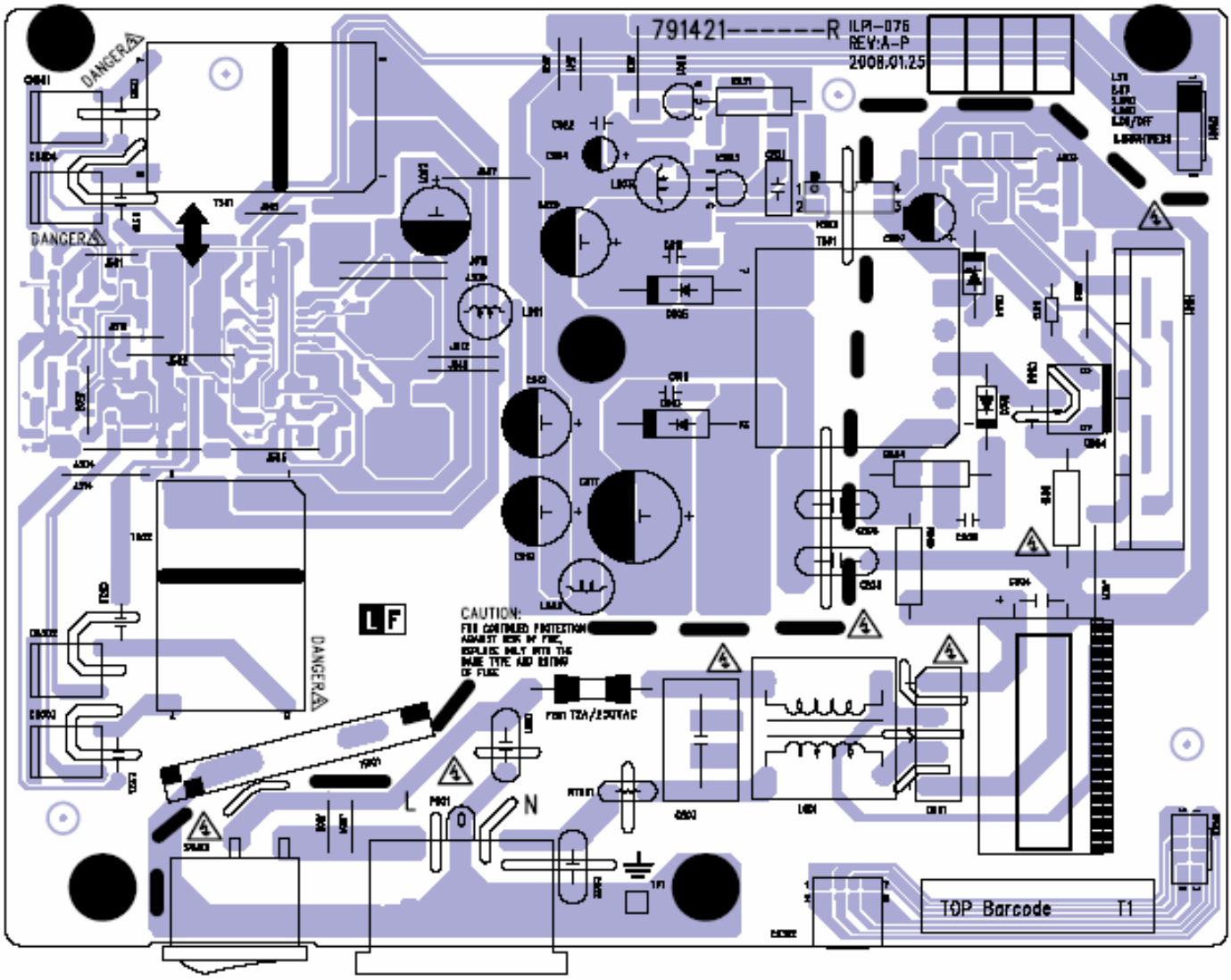
SHEET 5 OF 8	Rev : V01	

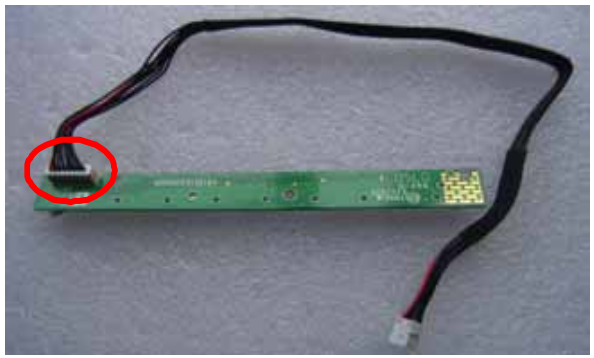


InnoLux ACER17"		
Document Number :	SIZE : A4	APPRO BY :
TITLE : POWER SUPPLY		CHECK BY :
DATE : 2007-10-09		DRAWN BY :
SHEET 6 OF 8	Rev : V01	

LAYER	SILKSCREEN TOP			
PCB NO :	ILPI-076	REV :	A-P	DESIGNER:Huang LM
FILE NAME :	ILPI-076 .PCB	DATE :	2008.01.25	

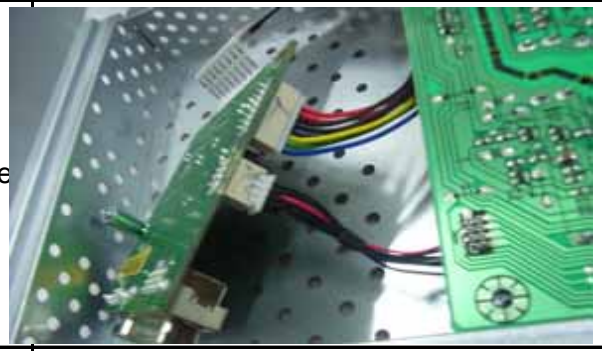
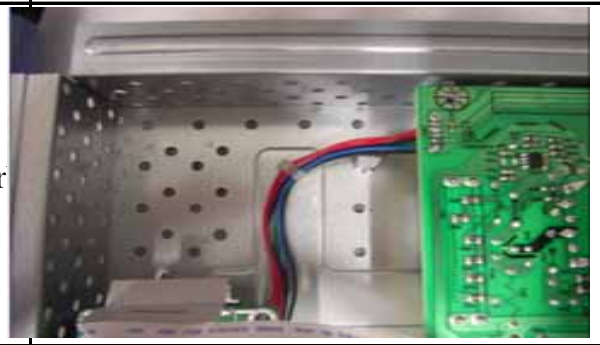


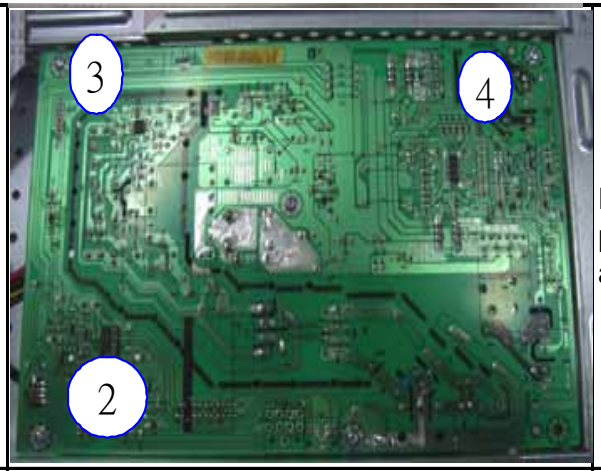
7.0 Assembly and Disassembly

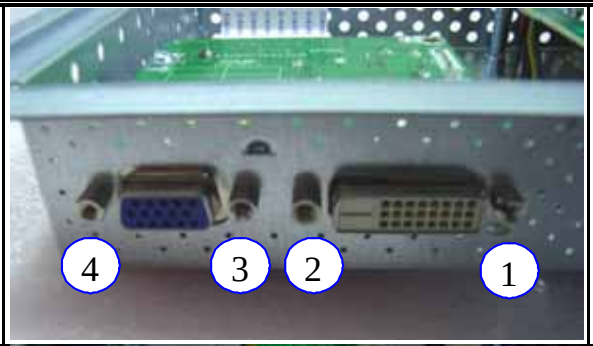
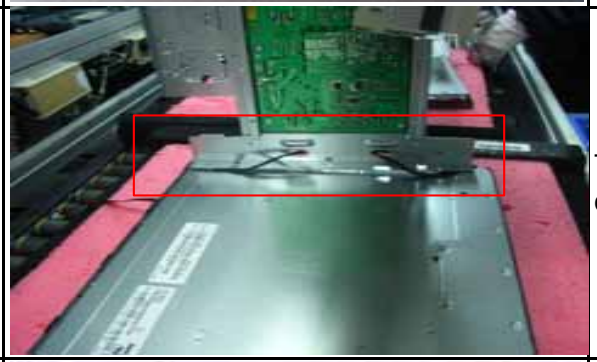
Sequence	Item	Photo	Procedures	P/N	Description
S1	Place panel		(1).Take panel out of box and place it on the foam. (2).Tear open the PE bag and put it in the designated carton. (3).Place panel on the foam like the attached picture. Remark:Do not touch the lamp cord and place the surface of panel downsides on the cushion.	631102072741R	LCP 17" MT170EN01-VC-G1,AM1700005C21(INN
S2	Insert Keypay's wrie		1.Check if the keypad and relevent wire you choose are OK. 2.Insert the wire into the keypad like the Picture	430300801760R	HRN ASSY 2x4P to 8P 160mm UL1571#28,ROHS
S3	Fix front bezel		1.Check if there is any lacquer missed or sctratch happened to the front bezel. 2.Insert the fixed keypad into the front bezel.	791401500000R	PCBA,KEYPAD BOARD,LE9D0-612 ROHS

Assembly and Disassembly continue)

S4	Assemble front bezel		1.Reverse the panel by 180 degree,put the surface of panel upsides and insert front bezel in the panel. 2.Reverse the panel by 180 degree using both hands,put the surface of panel downsides and make sure FFC interface is closer to operator. 3.Paste tinfoil on the position which refers to attached picture,in order to cover the gap in the panel completely. Remark:Make sure the fixed job is finished properly and lamp wire is closer to right hand;Make the tinfoil smooth in the corner of panel.	7140300159 00R	ASSY, BEZEL,V,GRAY SILVER,LE17J0
S5	Fix mainboard		(1).Insert FFC wire into its relevant interface of mainboard properly like attached picture1. (2).Insert the short keypad into its relevant interface like picture1. (2).Put the fixed mainboard in the right position.	7914213006 10R	PCBA,I/F BOARD(VC,EMEA),LE17 J0-622 ROHS
S6	Fix chassis &poweboard		Place the chassis on the cushion after check,like the attached Picture1.	7010000074 00R	ASSY,CHASSIS,B,W/ DVI , LE17K0(VC)

S7	Fix chassis &poweboard		Insert powerboard into the designated location of chassis ,like the attached Picture	791421401600R	PCBA,P/I BOARD,W/O SPK,LE17K0-622 ROHS
S8	Connect mainboard&powe board		Connent powerboard with the relevant PIN in the mainboard like the attached Picture	430303001520R	HRN LVDS FFC 30P 284mm W/MYLAR&Core ROHS
S9	Connect mainboard&power oard		Insert the powerboard wire into the clasp like the attached Picture		
S10	Twist PCBA screw		Handle electric opener and one pcs of M3*6 screw		

S11	Twist PCBA screw		Fix 3 pcs of screws separately on the poweboard and mainboard like the attached Picture1		
S12	Twist screw for ground-wire		Tear adhensive film out of adhensive film like attached Picture		
S13	Twist screw for ground-wire		Paste FFC wire on the disignated location like the attached Picture		

S14	Twist Hexagonal screws		(1). Handle hexagonal screws and electric opener (2). Twist screw in the interface like the attached Picture1. (3). Place cushion on the designated location after iron frame is taken away.		
S15	Fix chassis		Thread lamp wire into the relevant hole of chassis like the attached Picture		
S16	Insert FFC cable		1.Tear off the adhensive tape of FFC wire; 2.Insert FFC wire into the interface of panel 3.Put FFC wire in order and paste them on the panel 4.Fix chassis on the back of panel		
S17	Insert keypad Cable		1)Insert keypad wire into the relevant PIN in the keypad （2)Fix button on the relevant position of assemble （3)Confirm if keypad is inserted properly		

S18	Fix back cover		Check if back cover is fixed properly		
S19	Fix stand		Fix stand on the back of assemble like attached Picture		
S20	Fix hinge cover&base		Check if base is qualified and insert it into the relevant location properly like the attached Picture		
S21	Packing		(1)Release monitor to the packing line (2)Put monitor into carton like the attached picture		